GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CLXIV. No. 3156.] LONDON, NOVEMBER 7, 1923. [75TH YEAR. PRICE 1s.

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REFINED TAR.

CREOSOTE, ANTHRACENE AND CARBOLIC OILS. NAPHTHALENES.

BENZOL PRODUCTS:

Pure, 90's and Standard Benzol. — Pure and Commercial Toluol. — Light and Heavy Solvents.
65 per cent. Crude Benzol.

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SIMPLE. EFFECTIVE. LOW COST.

A NEW PRINCIPLE WHEREBY ALL COKE IS RECOVERED FROM PAN ASH AT A SMALL RUNNING COST.

INITIAL OUTLAY ON PLANT QUICKLY RECOUPED.

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WORKED ON THE SAME PRINCIPLE. TO DEAL EFFICIENTLY WITH

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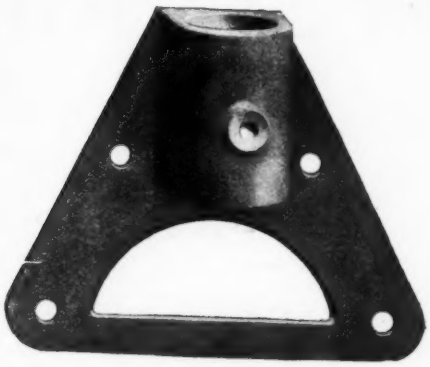
ARRANGED FOR 1d., 6d., 1s., OR ANY OTHER COIN DESIRED.

These Meters are giving Universal Satisfaction wherever adopted.



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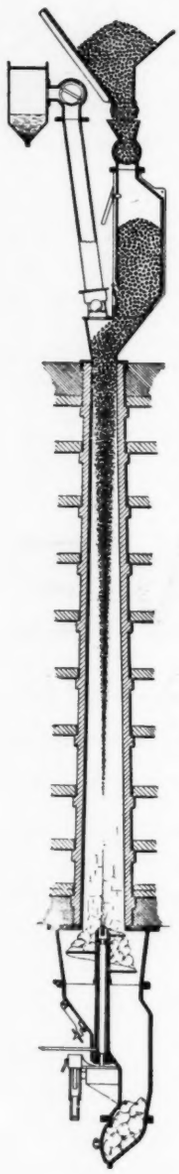

A GOOD RESULT

with Intermittent Systems of Carbonization is 75 therms per ton, but upwards of

100 THERMS PER TON

is readily obtained in one Continuous operation in

Glover-West Vertical Retorts

with corresponding increases in the yield of Tar and Ammonia

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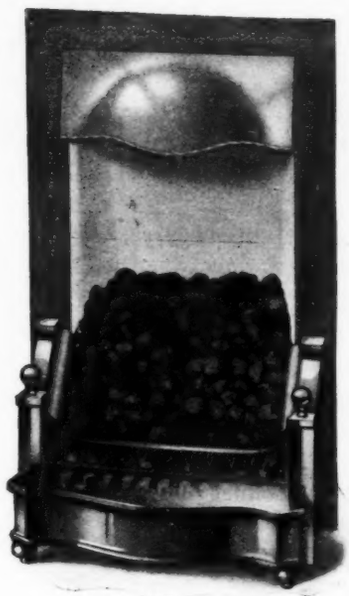
NEW YORK (U.S.A.) : 150, Nassau Street
Cable Address :— "VERTICALS, NEW YORK"
Telephone :— BEEKMAN 1420



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LONDON AND FALKIRK.

November 7, 1923.

Dear Sir,

This is the "Cinderella" Fire. It is not an ordinary gas fire, but is something unique in the history of gas heating.

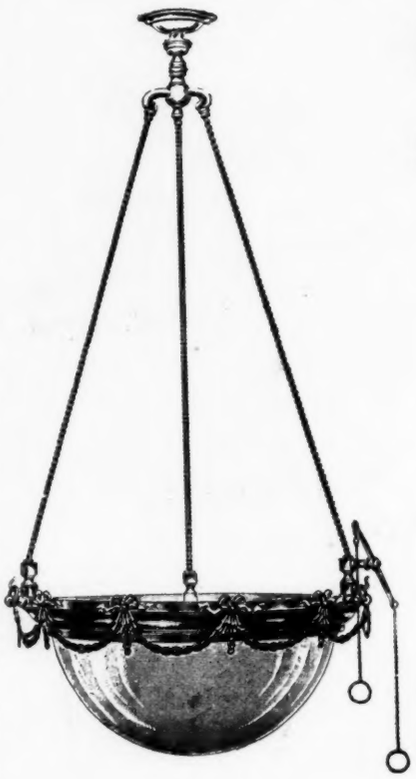
By introducing the "Cinderella" to the notice of your consumers, you will increase the gas sales of your Company.

To consumers appearance and reliability are of vital importance. In these attributes the "Cinderella" is unsurpassed.

May we send you a sample ? You can then test its many merits for yourself.

Yours faithfully,

R. & A. MAIN, LIMITED.



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BY
SEMI-DIRECT FITTINGS.

The popularity of the semi-direct System of Gas Lighting for Domestic Purposes is steadily maintained and a fuller appreciation of its worth for Shop Lighting is evident. The lighting capacity combined with the beautiful effects obtained render the system particularly suitable for these purposes. We have a large range of this type of fitting and we shall be happy to quote for your requirements.

Falk, Stadelmann, & Co. Ltd.
VERITAS LIGHT WORKS
LONDON · GLASGOW · MANCHESTER · BIRMINGHAM

JUNKERS
AUTOMATIC CALORIMETER
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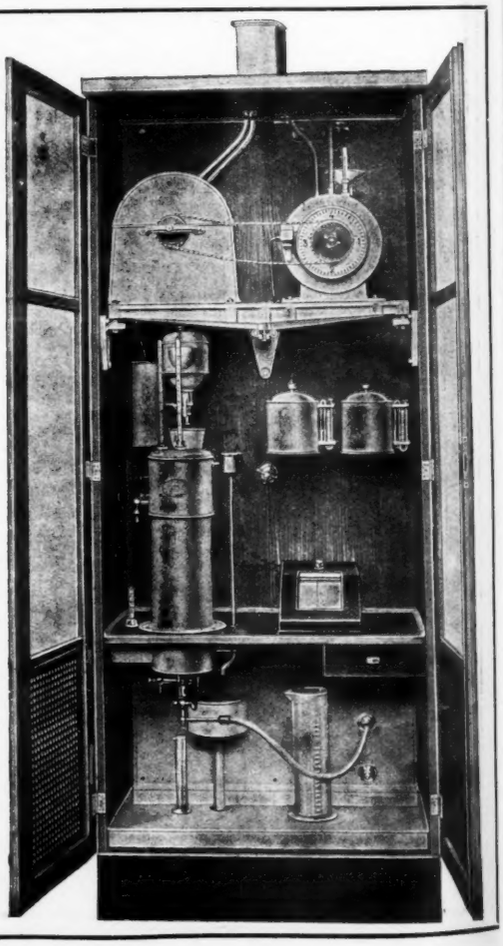
CALORIMETERS
Non Automatic. Portable Type.

USED ALL OVER THE WORLD.



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THIS METER designed and patented in 1864 is fitted with a unique Gas Passage where two castings dispense with six parts of a Tin Cased Dry Meter.

10-Light Dry Meter in Cast Iron Case.

THE METER for DAMP positions. Can always be repaired as long as the case remains unbroken.

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(Established 1850)

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are built in units of hourly capacities from

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for COAL GAS, COKE OVEN GAS, AIR, &c.

CHEAP IN PRICE, OCCUPY VERY LITTLE SPACE, EASILY CLEANED.

MEASURE THE TOTAL VOLUME OF GAS PASSING.

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FOR

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LOCOMOTIVES of all Sizes and Gauges specially constructed for Main and Branch Lines, Contractors, Docks, Gas-Works, Collieries, Iron-Works, Brick and Cement Works, &c. Locomotives of various Sizes always in progress for early delivery.

Photographs, Specifications, and Prices on Application.

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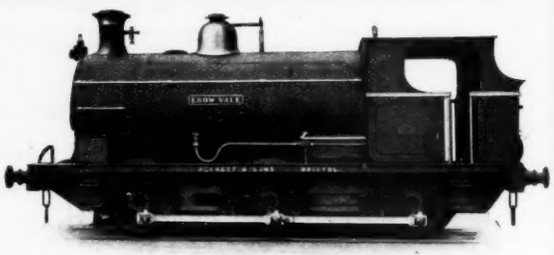

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Welded Joint Main—
Rhymney & Aber Valleys Gas & Water Co.

¶ British Mannesmann Tubes have been in use as Gas Mains for 20 years—in many cases under conditions that other materials would not have stood for 10.

Leakage, with its always serious, and sometimes tragic, results, is practically unknown on a British Mannesmann Main, with its few and efficient joints.

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Makers of Weldless and Lapwelded Tubes for all purposes, Tubular Lamp Posts, etc.

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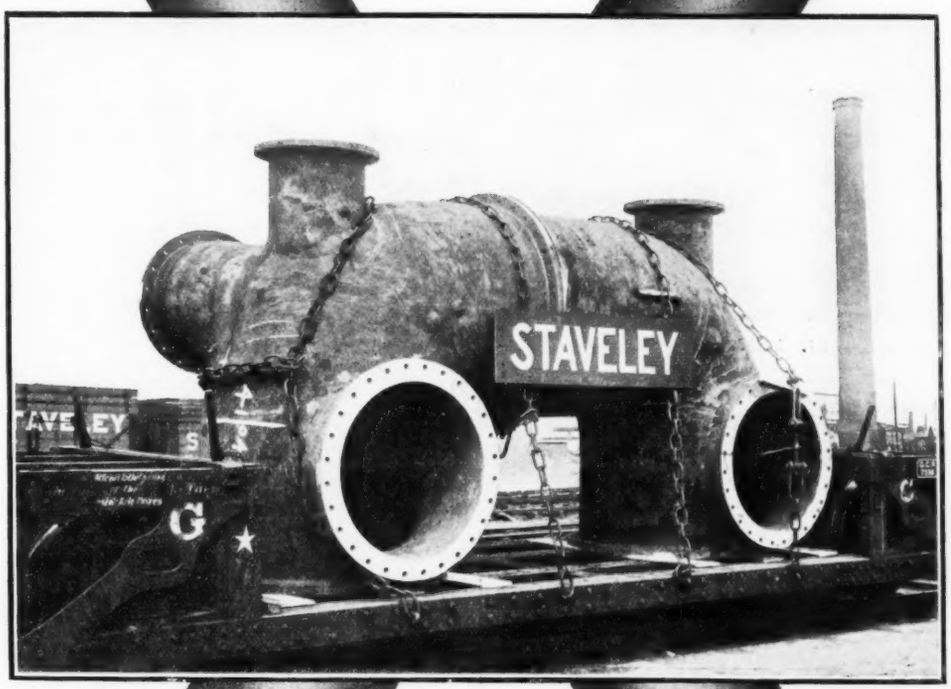

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BRITISH
STANDARD
CAST IRON
PIPES
For LONG LIFE & RELIABILITY.

STOTHERT & PITT, LTD.,
BATH.

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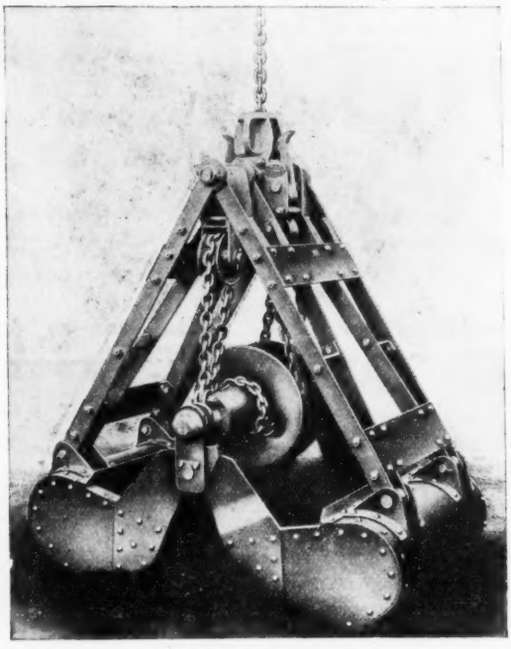


FIG. 1330.

GRABS ("BACON" PATENT)

FOR

COAL : COKE
SLAG : ASHES

ETC.

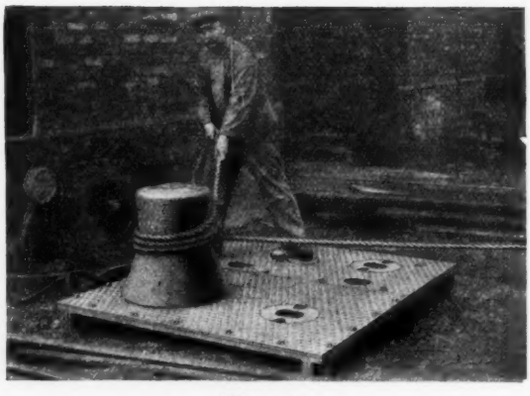
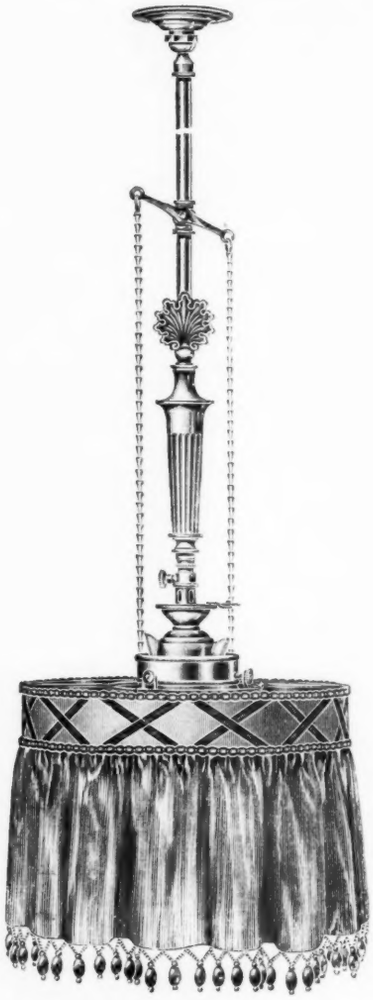


FIG. 884.

ELECTRIC CAPSTANS
OF ALL TYPES AND SIZES.

Smith's *for* Service

Whatever your requirements may be in
LIGHTING — HEATING
— COOKING
We can deal with them
PROMPTLY and to
YOUR SATISFACTION.



An Example in New Shade Lights.
½" × 39"

No. 27863.
Oxy-Copper Finish.
Ea. **28**/- *subject.*

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Oxy-Silver Finish.
Ea. **31**/- *subject.*

12" Shade.
No. 26646.
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GET OUR NEW PRICES
Write US To-day —Do it Now.

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Ea. **24**/- *sub.*

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(ESTABLISHED 1839)
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GLASGOW: 118, HOWARD STREET

W-D

WOODALL-DUCKHAM VERTICAL RETORTS

FIRST IN 1903 — FOREMOST IN 1923

The WOODALL-DUCKHAM VERTICAL RETORT & OVEN CONSTRUCTION CO (1920) LTD.

Extracts from the "Gas Journal" for 13th June 1923

WORKINGTON GAS-WORKS RESULTS.

Mr Hedley Hoy (the Engineer and Manager), in his report to the Workington Corporation Gas Committee for the year ended March 31, says that the gas produced per ton of coal carbonized shows a further increase of 19,910 c.ft., or 87·6 therms; the gas sold per ton being 15,142 c.ft., or 79·8 therms. Both figures are a record for the department, and he believes they have not been exceeded by any other undertaking. The average calorific value of the gas supplied during the year was 440 B.Th.U. The vertical-retort plant has worked satisfactorily during the year. The quantity of residuals produced shows an all-round improvement, especially in the case of tar and sulphate of ammonia. The net return from residuals was 55·74 p.ct of the cost of coal, against 42·64 p.ct. for the preceding year. Gas used by ordinary meters shows a substantial increase, while in the case of prepayment

1000 c.ft.

Alderman Hall, in presenting the report to the Council, remarked that a year ago he asked Mr. Hoy to give them 20,000 c.ft. of gas, without reducing the quality, and an equal return for residuals. The department had produced from each ton of coal 19,910 c.ft. of gas, without 11·87 cwts. of coke, 16·03 gallons of tar, and 29·72 lbs. of sulphate of ammonia. If they converted these figures into weights, and added 5 p.ct. additional weight through steaming the charges in the retorts and the weight of acid taken up in the sulphate process, they would find for every ton of coal used a ton of products. If they took the increased yield of 743 c.ft. of gas, there was a saving of 304 tons of coal; and adding to the value of this the increased yield of coke, tar, and sulphate of ammonia, it would be found that the whole of the Engineer's salary had been met. Every section of the department was alive and growing; and more and more they were reaping the benefit of the showrooms and distribution staff, by getting the public to understand the advantages of gas. He had never presented the accounts with greater pleasure, knowing, as he did, the good work of the Engineer, staff, and employees.

The report of the Borough Treasurer (Mr. T. Armstrong) states that

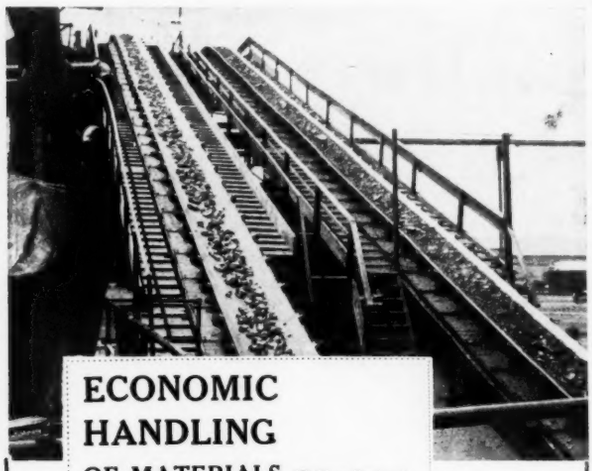
For all particulars apply to

The WOODALL DUCKHAM CO.

Head Office: 52 GROSVENOR GARDENS, S.W. 1.

Telephone: 9272 VICTORIA *Telegrams* RETORTICAL : : SOWEST

Manchester District Office: Lloyds Bank Buildings, King Street, Manchester.



ECONOMIC HANDLING
OF MATERIALS (Robins System)

Two 36 in. Robins Belt Conveyors installed at a large By-Product Gas and Coke Plant. The Conveyor on right carries 300 tons of coal per hour from the dock to the plant, while the Conveyor on left carries the coke from the plant to the dock for shipment in barges.

Advice offered and schemes prepared for any work in any part of the world.

FRASER & CHALMERS ENGINEERING WORKS

PROPRIETORS THE GENERAL ELECTRIC CO. LTD

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LONDON OFFICE
MAGNET HOUSE KINGSWAY, W.C.2.

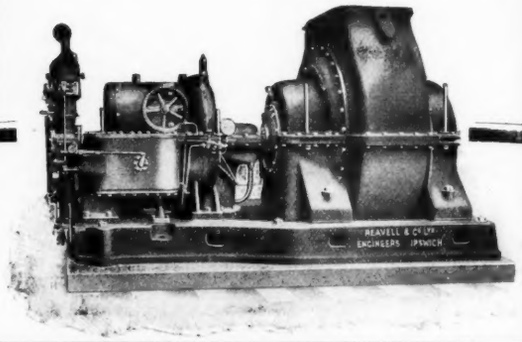
Associated with
ROBINS CONVEYING BELT CO., OF U.S.A.

GAS COMPRESSORS & EXHAUSTERS

We supply a complete range of Compressors & Exhausters for gas and air, suitable for all purposes connected with the Gas Industry, including Turbo Compressors for large capacities, as illustrated below.

WRITE TO DEPARTMENT "J" FOR PAMPHLETS GIVING FULL PARTICULARS.

REAVELL & CO., LTD.,
RANELAGH WORKS, IPSWICH.



The Components of Efficient Lighting

Good gas lighting depends mainly on two essential factors – the quality of the gas used and the medium by which that gas is distributed for burning.
The Welsbach Gas Mantle is the most efficient medium for economical and brilliant lighting. The high quality and durability for which it is renowned have stood effectively the test of forty years of fierce competition.

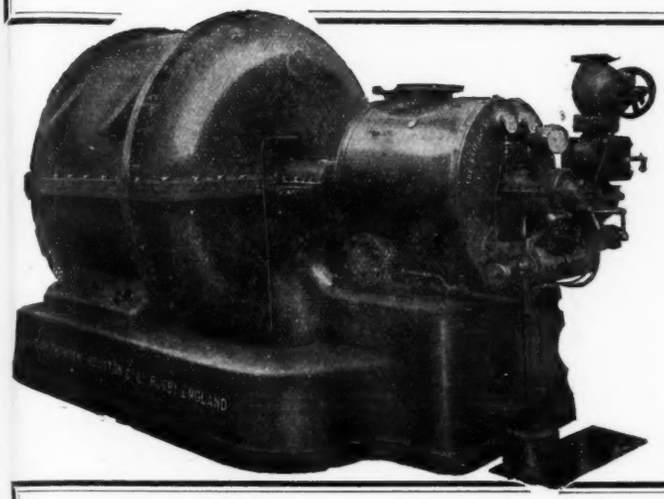
GAS MANTLES **WELSBACH** GAS BURNERS

The First on the Market and the Foremost ever since.

PPS. 241.

Advt of the Welsbach Light Co., Ltd., Welsbach House, King's Cross, London, W.C.1.

Turbo Gas Exhausters.



B.T.H. Turbo Gas Exhausters possess the combined advantages of low steam consumption, negligible maintenance costs, the ability to maintain a perfectly steady vacuum irrespective of output, and no internal lubrication necessary. They are of simple construction and of small size in comparison to output.

The British Thomson-Houston Coy., Ltd.,

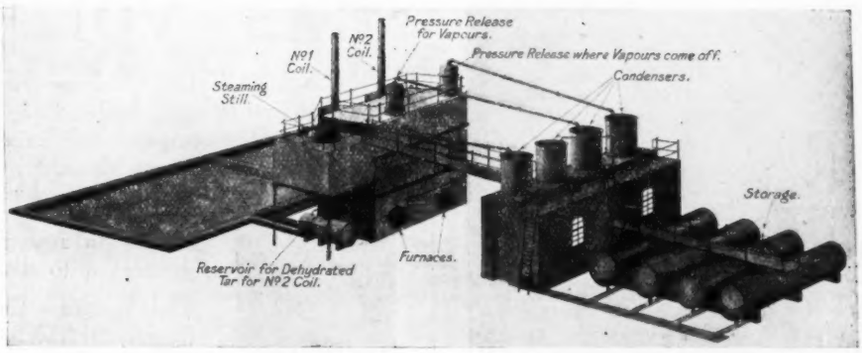
Electrical Engineers and *Manufacturers,*

Head Office & Works, Rugby. England.

London Office :: :: :: "Crown House," Aldwych.

B T-H

Continuous Tar Dehydration and Tar Distillation.



DEHYDRATION.

Simplicity and low capital cost.
Ease of handling and minimum of labour.
Economical working of fuel.
Entire absence of fire risks.
Adapted for many purposes.
Distillation of tar can be carried out to pitch by small addition.
Can be used for Topping Creosote, Crude Light Oil and Debenzolising Wash Oil.

Our Balance Sheet of Cost is well worth investigation—Ask for a Copy.

DISTILLATION.

1. The pitch can be tested in bulk and corrected if necessary before running off.
2. The continuous dehydration ensures the maximum output through the FINAL still.
3. Dehydrated tar can be made without the FINAL still.
4. Variation of water content does not reduce the throughput.
5. The tar is absolutely dehydrated before the tar enters the FINAL still, and stills *never froth.*
6. Large saving of fuel.
7. Any number of cuts can be made.

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The Original Inverted Incandescent Gas Burners and Mantles.

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Standard Large.

A neat and artistic Burner at a popular price.

"Nico" Burners are the Hall-Mark of Efficiency Simplicity and Durability.

No. 23.
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A low-priced Burner of "Nico" quality. This Burner, which is also made in medium, bijou, and 3 light bijou superheater sizes, has been designed to meet the demand for a Good Quality Burner at a Competitive Price.

"Nico" Mantles are Unsurpassed for Strength Brilliancy and Lasting Power.

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3-Light Bijou Superheater Burner. Highest possible efficiency.

New Season's Gas Catalogue (134 pages) Now Ready. Post Free on Application.

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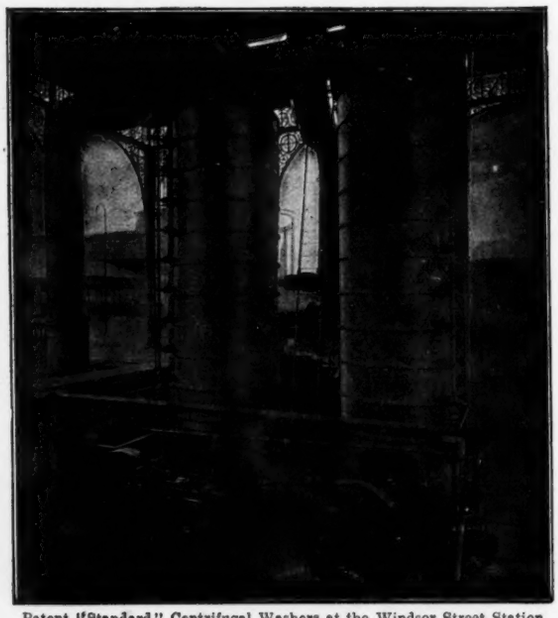
Manufactory—ROSCAR WORKS, SUMMERHILL ROAD, BIRMINGHAM

Telephone—Holborn 2680 (2 lines). Telegrams—"Validness, Lud, London."

PATENT

"Standard" Centrifugal Washers

For Extraction of Ammonia, Toluol, Cyanide, Benzol, Naphthalene, etc., from Coal and Other Gases.



Patent "Standard" Centrifugal Washers at the Windsor Street Station of the Birmingham Corporation.

NOTE:—Repeat order received for two machines for this Station, and one in use at Saltley Station.

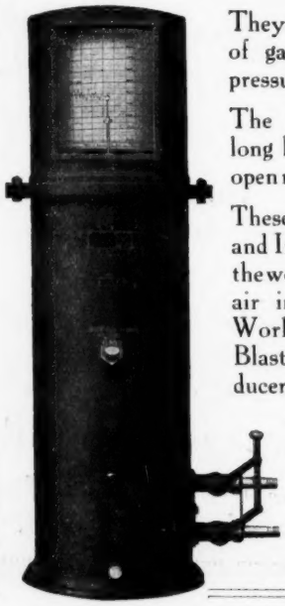
KIRKHAM, HULETT, & CHANDLER, LTD.

37 & 38, Norfolk House, Norfolk Street, Strand, London. W.C. 2.

Telegraphic Address—"WASHER ESTRAND LONDON." Telephone No. 1348 CITY.

MEASUREMENT OF GAS VOLUMES

"ARKON" Gas Volume Recorders and Indicators are hydrostatic instruments, simpler, more compact, and far cheaper than any other form of Gas Meter.



They are used for any quantity of gas, in any pipe, at any pressure up to about 22 lbs.

The Recorder Chart is 24" long by 8" high, giving a very open record of the daily gas flow

These Gas Volume Recorders and Indicators are used all over the world for measuring gas and air in Gas Works, Chemical Works, Coke Oven Plants, Blast Furnaces, and Gas Producers, etc.

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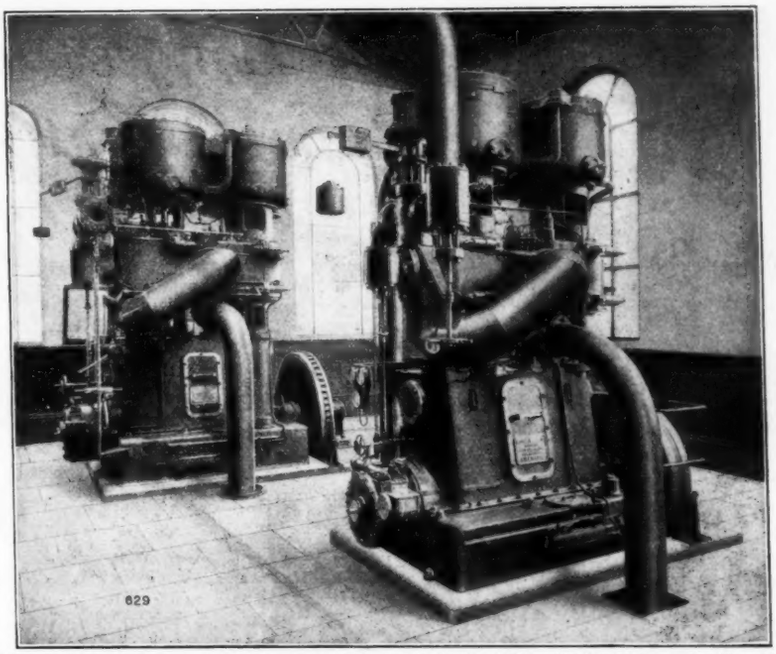

Other Specialities.

HEAVY OIL ENGINES (Diesel Type).

PARAFFIN ENGINES.

PNEUMATIC HOSE COUPLINGS.

Two of three Steam Driven Gas Compressors installed at Birmingham Corporation Gas Dept.
One of 150,000 cub. ft. per hr. to 15 lbs. per sq. in.
Two ,, 300,000 ,, ,, ,, 15 ,, ,, ,,

Telegrams—
"BELLISS, BIRMINGHAM."
ESTABLISHED 1852.

BELLISS & MORCOM, Ltd., BIRMINGHAM.

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When no flue is available, then— the Gas Salesman can, with confidence, recommend Clark's Patent Hygienic Syphon Stoves. For over 30 years they have been in constant use for heating Shops, Offices, Workrooms, Halls, Corridors, &c

CLARK'S Patent SYPHON STOVES

are easily fitted and can be placed in almost any position. The whole of the heat developed is usefully employed—they are 100% efficient.

The arrangement of the burner complies with the demand for visibility of flame so pleasing to the eye. The copper reflector also serves to reflect a cheerful glow. Fitted with Vitreosil Chimneys. *No flue outlet required.*

Send for supplies of attractive selling literature.

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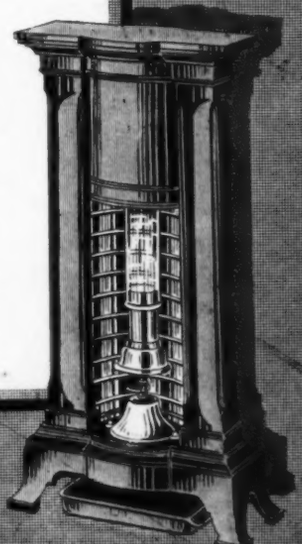

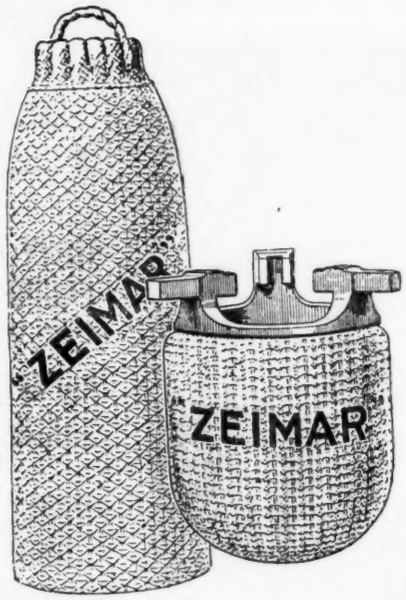

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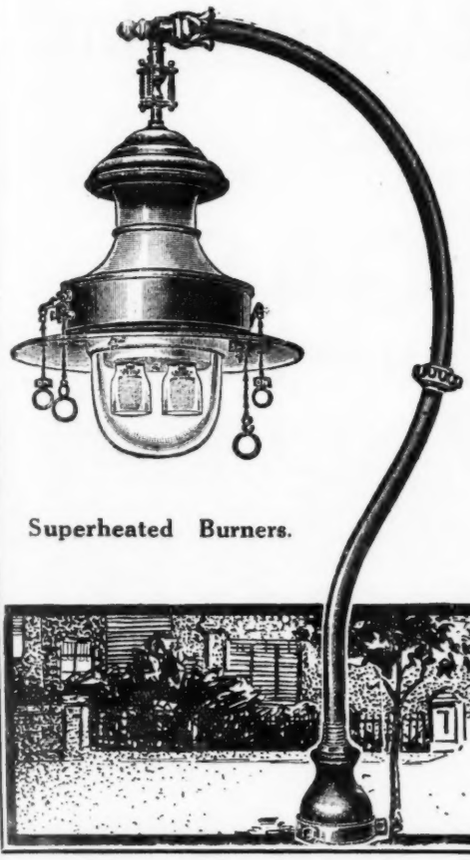

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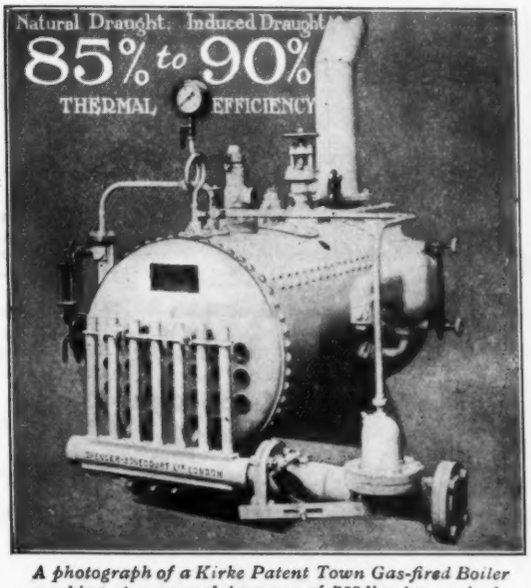

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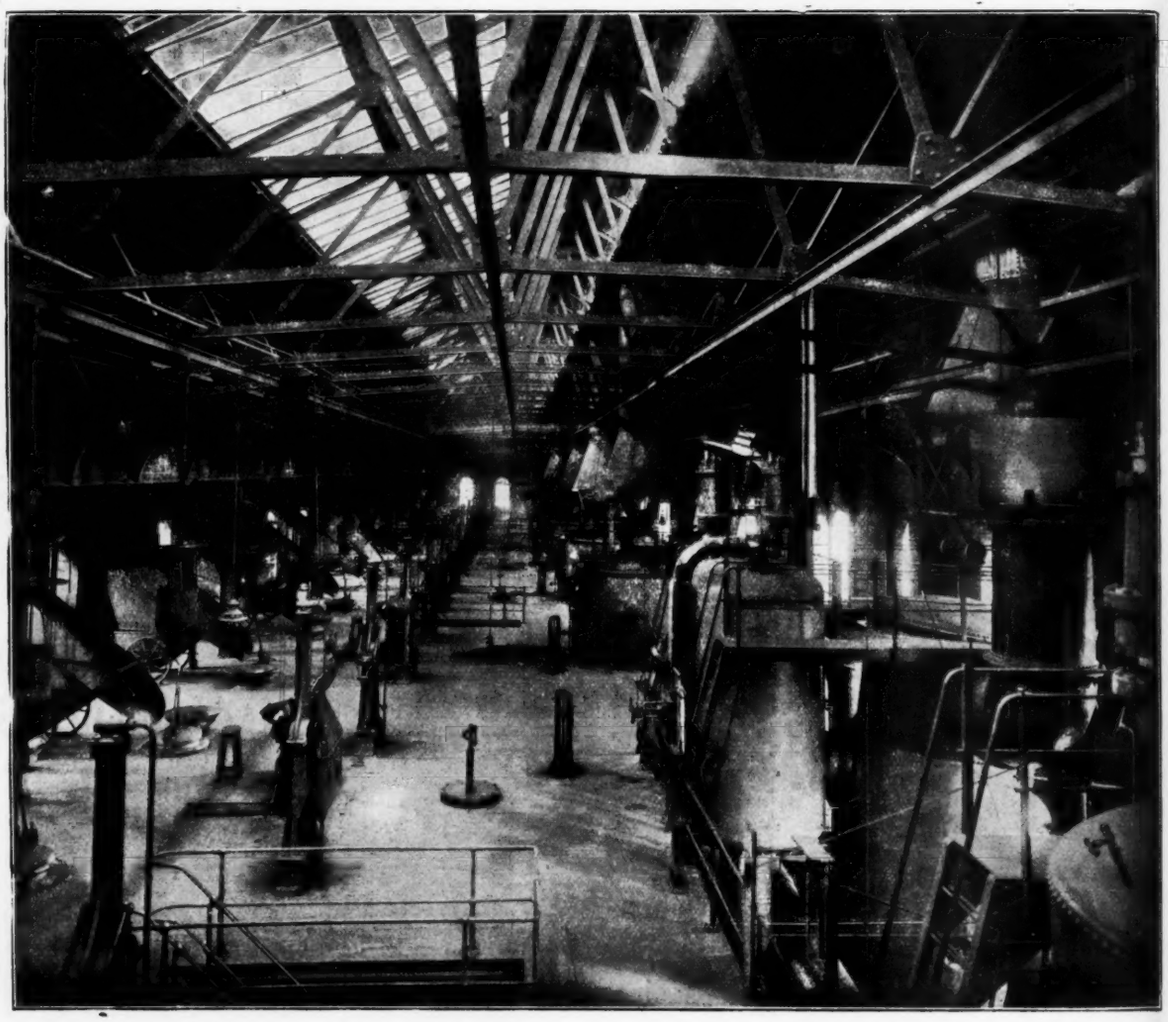

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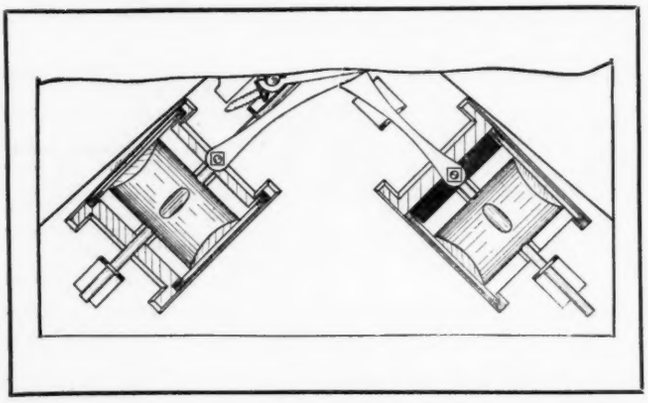

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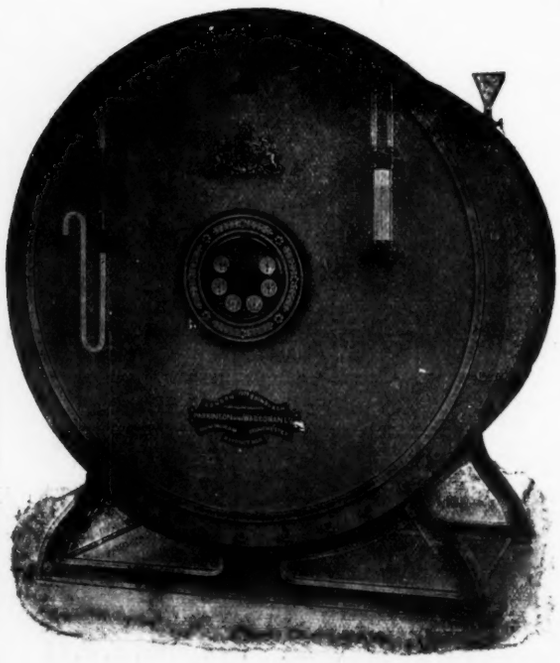

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EDITORIAL NOTES.

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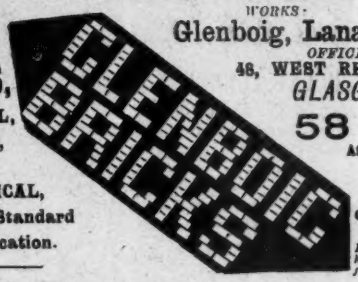

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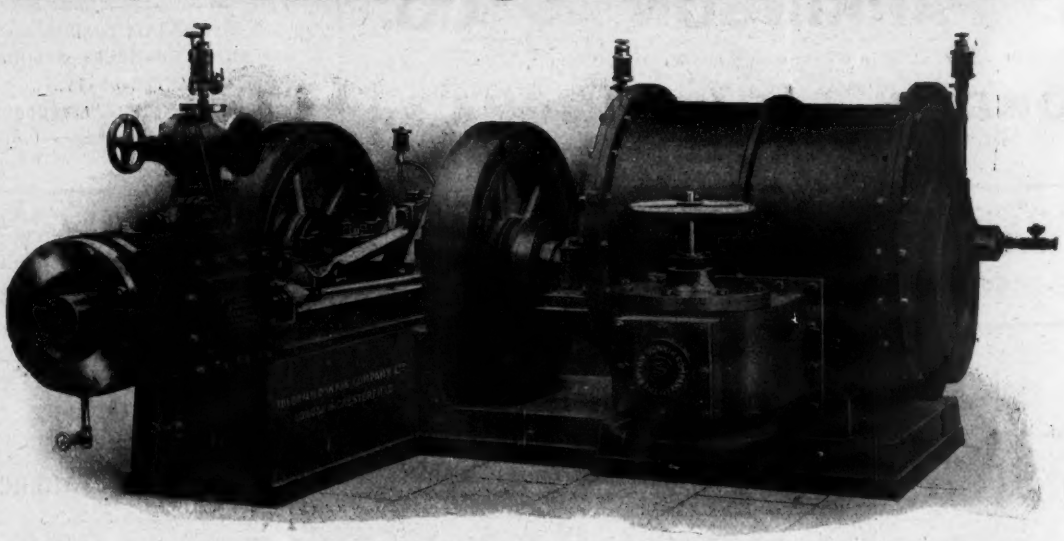

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That difficult problem is one which must be left to others to consider and discuss. But it may help them if we point to some of the results that complete organization has given in the United States. We have in later columns a pen picture of the impressions of a highly esteemed American correspondent who was present at the recent annual meeting of the American Gas Association—the largest Gas Association that the world possesses to-day. It was only the fifth meeting of the complete organization which now exists; but it is exactly half-a-century ago that the first small meeting was held which founded the original American Gas Association. We congratulate the more powerful organization of to-day upon the jubilee of the planting of the sapling which has developed and developed until the whole of the interests of the American gas industry are incorporated in its now mighty trunk—the result of intelligent culture and perceptive wisdom. To-day, says our American contributor, "the keynote is service—how to make each unit, and the industry as a whole, perform most efficiently its indispensable rôle in the nation's life." Without complete organization, and a uniting of forces, we cannot avoid falling short of the maximum possible efficiency in our industrial affairs. Just ponder over this fact—that to-day at the annual meeting of the American Gas Association the attendance is no less than 3000; and the number is divided into six groups. Yet after four days' conference that vast number separate to their daily duties conscious of how many are the important questions that remain for solution. With all the concentration of so many minds, there is so much to be done that time is against them. Look again on another prominent feature of the meeting. There were 3000 gas men from all parts of the United States gathered in Atlantic City; and those 3000 men were able to inspect an exhibition of the apparatus and appliances of 160 manufacturers who are members of their appropriate section of the Association. The extent of that exhibition is seen by the fact that no less than 27,000 sq. ft. of space was required for the accommodation of the exhibits on the famous Steel Pier. Apart from the discussions on technical, commercial, financial, and administrative questions, the exhibiton must have been marvellously valuable in enlightenment to men who could not have had any other opportunity of examining such a collection of the latest of gas productions from the manufacturers all over that extensive country. It is the recognition of the fact that the operations of the apparatus and appliance manufacturers are an integral part of the work of the gas industry, and that they have a right to inclusion in the Association—"association" to which the broadest meaning is given—that such a comprehensive exhibition was made possible. Then another point. Our contributor refers to the "wonderful" financial showing of the Treasurer's report. The receipts for the year amounted to $260,000—shall we call it £54,000?—and there is an accumulated surplus of $100,000 in cash and securities. We cannot, nor do we wish to, give a stronger comment upon this than was supplied by our old friend and occasional contributor: "Truly, our gas industry "in this country has 'found itself,' and each year shows "more clearly how much good results from the possession "of adequate resources by a trained staff, reinforced by

"volunteer committees, and all working for, and speaking "in the name of, a truly national organization."

With regard to the proceedings at the sectional meetings, we shall, as opportunity permits, be publishing abstracts of some of the papers. Our American correspondent gives an indication of certain of the matters discussed. They are varied and far-reaching. He mentions the account given by Dr. E. W. Smith of experiences in this country with the therm. The lecture has already been published in our columns, and a few editorial reflections have been given regarding Dr. Smith's views of the position of the therm system. We agree with the President of the Association (Mr. R. B. Brown, of Milwaukee) as to the substantial present position and wonderful prospects of the gas industry. When we get a more intimate knowledge of what he means by "standardized" methods of gas manufacture, we shall be able to say whether or not we agree with him in that. When we think of standardized methods of gas manufacture, we wonder whence the standardized coal is to come and the standardized requirements for gas. Another matter is that in the United States much successful work is being done in securing customer ownership of gas capital, as well as employee purchasing of shares. This is a sagacious movement. It has been adopted somewhat lightly in this country; but our Parliament sometimes regard matters too strictly from the point of view of the public, and treat as of secondary consideration the best interests and stability of a public utility concern. And so we get conditions inserted in auction clauses and so forth as to the issue of gas capital, which are not always to the advantage of gas undertakings. Sometimes they work all right in securing cheaper capital; but we have a big belief in the strength that comes from making customers and employees co-partners to the fullest possible extent. Everything that produces additional safety for a business is politic. Another point upon which we agree is as to proper supervision and remuneration of all employees in direct contact with the consumers. With the reason advanced by our contributor for this, however, we are not altogether enamoured. Proper supervision and remuneration, he says, should be given "to ensure the consumer courteous treatment at all times, and thus build-up for the company the lasting goodwill of its community." We do not believe in money payment being regarded as something necessary to "ensure" courteous treatment of consumers. We believe in a money payment being adequate to secure the services of men whose very nature ensures them being gentlemen in all circumstances and on all occasions.

This is a general reference to points that arrest attention in our correspondent's review of the proceedings at the annual meeting of the American Gas Association; and we have to confess—and we do so without qualification—that that Association has given the lead to the gas industry the world over in the matter of organization to realize the utmost co-operative efficiency in the interests of gas undertakings. And we may remind readers that Alderman Lloyd tells us that only prejudices hinder a consummation in gas organization in this country which would bring us up to the standard that has been reached and set by America.

Record Orders Despite Strenuous Competition.

A GREAT deal has been heard lately as to what is being done in Glasgow by the Corporation Electricity Department. Puffs of all kinds are found in the electrical papers; and the professed beliefs of the Department are well disclosed by the extracts from a circular to which Mr. J. Jamieson called attention in his Inaugural Address to the Scottish Salesmen's Circle, as published in the October issue of "THE GAS SALESMAN." In that circular, it was stated that "the late Convener of the Electricity Propaganda Committee was sanguine enough to believe that once these electric houses [all-electric houses] are set going, gas need not be introduced for any purpose in any future building scheme." Of course, it "need not," if the tenants do not want it, and are prepared to pay the piper for something else. What is more important from the tenants' point of view is that electricity "need not" be introduced, if cheaper gas is used in future housing schemes. The circular also quotes the question asked some time since by the misinformed "Glasgow Herald"—"Has the time not come to admit frankly that gas is out of date?" We dealt with the "Glasgow Herald" in our issue of Jan. 31 last [p. 256]; and it is unnecessary to refer again to the ignorance disclosed by its article, seeing that it has never had the courage to reply to our criticism. We do not remember that the Glasgow Gas Department has ever set-out to attack the Corporation Electricity Department in similar ways; and, in our opinion, the Corporation would be well advised to put an end to any warfare such as may arise between the two Departments, if such representations are permitted as are contained in the circular to which we have alluded. If attacks are made by one department, then surely the other should, if desired, be permitted to make reply. The Gas Department have no fear as to the results of the electricity campaign. Experience proves more than words; and it is a bad sign when one municipal trading department has to have recourse to attacks such as the circular instances for the purpose of trying to develop business, instead of relying upon the merits of its commodity and appliances.

Facts speak. The outstanding fact regarding gas and electricity affairs in Glasgow is that the Gas Department is experiencing a record demand for gas-consuming appliances—despite the activities in the cooking and heating line of the Electricity Department. During the past three months, investigation shows, the Gas Department, in addition to their own permanent staff of 250 fitters, have employed the staffs of over 300 master plumbers in Glasgow. These are things that are not done for fun. At the present time, the anxiety of the department is not caused by electrical competition, but by the difficulty of meeting the demand for gas appliances. The position is not being over-stated when we say that more than 3000 gas-consuming appliances are on order to be fitted in the Glasgow gas-supply area. In later columns, some information is given as to the success achieved by gas at the recent Housing and Health Exhibition in Glasgow; and a chart which accompanies the notice shows that, during the period of the exhibition, orders were received for upwards of 2000 gas-heating appliances, nearly 920 cooking apparatus, and about fifty water-heaters. What have the electrical people to say to the verdict of the public, as attested by these figures, in view of the exertions of the Electricity Department? It does not look as though the citizens of Glasgow regard gas as obsolete, or as having been superseded economically or otherwise by electricity. We repeat, facts speak; and on this occasion eloquently.

"Broadcasting."

WE have led the pace for the electricity industry in many ways in propaganda work. Our "B.C.G.A." long anteceded the Electrical Development Association; and the methods of the former, so far as known, have been largely adopted by the latter, or at any rate to the extent that means would allow. The roads of our general advertising and educational work have also been trodden with a faithfulness that flatters gas undertakings. We do not blame the electricity undertakings or their Development Association. Approval of our methods shows that, up to the point to which they go, there is nothing better. But the electrical industry beat us in taking advantage of the broadcasting boom to circulate messages regarding the merits of electricity to listeners-in within the range of the broadcasting station. Naturally, there have been several omissions in certain of those messages. Only those things which an electrician may tell have been told. A commodity may possess many merits, and at the same time many demerits; but in the case of electricity, the time available for a lecturette has not allowed, even had there been the will, of mention being made of the demerits. From the electrical point of view, that perhaps is just as well.

However, anything that a competitor does which is in any way valuable in respect of propaganda must be done by the other party; and so to-day, Mr. F. W. Goodenough, Chairman of the Executive Committee of the "B.C.G.A.," is broadcasting a short lecture on gas. The time permitted (by those addressed) for this sort of thing is not long; and so there has to be compression of an order that does not do full justice to the subject. Naturally, too, the occasion demands that the lecturer should treat his subject in as elementary a fashion as possible, so that all listeners-in may appreciate the points. Otherwise, the broadcasting of such a topic would be altogether valueless. We are publishing Mr. Goodenough's brief lecture in other columns, and although we are not "listening-in" this evening, we can believe that the chatty style in which the lecture is being delivered will hold the ears of a good many people, and that some of the seed that is scattered will fall on good ground. Just one point in the lecture to which we may give the emphasis of repetition: "The heaviest gas "consumption per acre in London is in the Harley Street-

"Wimpole Street area. Thousands of gas-fires are to be "found in the homes of our leading physicians and surgeons, "in nursing-homes, and in hospitals. That is a sufficient "answer to any query as to the healthiness of gas heating." It is a sufficient answer, too, to those electrical men who ignorantly talk of escaping poisonous fumes from gas-fires. The experience of prominent physicians is of a value vastly superior to the talk of people without experience.

However, although the methods adopted by trade competitors have to be countered, we are not altogether satisfied that the "broadcasting" method of advertising will bring any large reward. Trade announcements, we believe, are unwelcome intruders to most listeners-in. They "listen-in" for recreation, and not for instruction as to the virtues of this or that commodity, as delineated by a representative of those who have the commodity for sale. They want music, or the humour of the music-hall artiste; and they will resent the intrusion of a voice that may be very fine and eloquent, but is giving vent to something that is not expected and is not required. Many a listener-in will say "Hang Gas!" and "Hang Electricity!" It is wrong perhaps to use such expressions; but disappointment may perhaps be permitted a little liberty.

The Bi-Part System of Gas Charging.

HALIFAX is being made the experimental ground for new systems of gas charging. A departure from the flat rate was originally due to the belief of Mr. W. B. M'Lusky and his Committee that, given facilities for getting gas at a cheaper price beyond a certain consumption, the users of it would increase their patronage. The results have justified the belief; but still there is no evidence that, had there been an all-round reduction of price, the result would not have been the same. We know that during the past five years the rate of increase in consumption in the industry generally has been higher than in any of the three preceding quinquennial periods. But Mr. M'Lusky holds that there has been sufficient proof at Halifax that the new system is really popular; and we believe his opinion is that it has done more than flat rates and discounts could have done to boost consumption. We commented on the new system when the author of it introduced it at a district meeting of the "B.C.G.A." at Oldham last spring; and we do not withdraw from what was then said that, if it showed a greater success than the system of flat charges with discounts for large consumption, then the increase so obtained would be an advantage to both the gas undertaking and the consumers, inasmuch as any method which increases the day load and reduces the distribution and other charges per 1000 c.ft. or per therm is a benefit. As to the popularity of the new system among Halifax consumers there can be no doubt from what Mr. M'Lusky said in his paper seven months or so ago. Then about 25 p.ct. of the whole number of consumers had adopted the system. With respect to it, however, we made two objections—the first as to the arbitrary basis on which the system was based, which gave an advantage to large families who lived in small rooms over small families who lived in large rooms, and the second that the system was not generally applicable, inasmuch as it could not be applied to companies having a standard or basic price and a standard or basic dividend. It is unnecessary to reiterate the arguments then advanced.

The system is known as the "standard requirement" scheme; the "standard requirement" being based on the floor area of the living and reception rooms; the multiplier per square foot per annum being taken as 37½ c.ft., which represents the amount of gas that is sufficient for lighting purposes with the modern inverted burner. Suppose the combined area of a living and reception room is 320 sq.ft.—multiplied by 37½ c.ft., this gives 12,000 c.ft. This 12,000 c.ft., or whatever the "standard requirement" may work out to, is charged at the full current price of 3s. 11d. per 1000 c.ft., and all above that quantity at 6d. less. Now as from next March, there is to be an alternative system, which will undoubtedly be an advantage to the consumers compared with the present system, and should encourage the further use of gas. The idea follows very much on the lines of the electrical bi-part tariff, under which the consumers pay a fixed charge, and get their electricity at a low price per unit. The "standard requirement" for gas will still be ascertained in the same way; and upon this the fixed charge will be based, at the rate of 1d. per 1000 c.ft. a week. Suppose the "standard requirement" is 9000 c.ft. per annum, the fixed charge will be 9d. per week, or 9s. 9d. per quarter, or 39s. per year payable quarterly; or if the "standard requirement" is 15,000 c.ft. per annum, the fixed charge will be 1s. 3d. per week, or 16s. 3d. per quarter, or 65s. a year. All gas consumed will be charged for at the fixed price of 2s. per 1000 c.ft. This 2s. should be an effective stimulus to an increased use of gas. But we should strongly advise the consumers, however big their gas requirements, if they wish to be economical and do not mind the inconvenience, to look out for houses with small living and reception rooms, so as to have their "standard requirement" and fixed charge calculated on the lowest possible basis.

Let us see what happens from the three examples Mr. M'Lusky gives in the announcement we made of the alternative system on p. 271 of our issue for Oct. 24. The consumer whose "standard requirement" is only 9000 c.ft. per annum uses 49,700 c.ft., and pays a total of 138s. 5d. per quarter. This is only 5d. more than the man pays whose "standard requirement" is 12,000 c.ft., but who only uses 43,000 c.ft. a year, or 6700 c.ft. less. If the latter increased his consumption to the same amount as the other consumer he would be paying in his total between 13s. and 14s. more per annum than the other man. Why? This alone shows the unscientific nature of the basis for ascertaining the fixed charge. But a further and worse illustration is supplied by the consumer whose "standard requirement" is 15,000 c.ft., and whose consumption is higher than the other two—namely, 56,200 c.ft. He pays 177s. 5d. per annum in fixed charges and consumption. We want to know why this man who consumes 56,200 c.ft. should, under the alternative system, pay more per 1000 c.ft. than the man who consumes 49,700 c.ft. Working out the figures, the latter pays an average of 2s. 7d. per 1000 c.ft.; the former 3s. 2d., or 7d. per 1000 c.ft. more. Perhaps Mr. M'Lusky will show us the justification for this. Of course, we quite appreciate that the farther a consumer carries his consumption, the lower the average of the fixed charges will be per 1000 c.ft. But assuming the cases given for illustration purposes represent the maximum requirements of the three consumers, then the fairness to the largest consumer is not very clear. What Mr. M'Lusky does prove is that compared with the original "standard requirement" system, the consumers will always benefit from the fixed charge, *plus* 2s. per 1000 c.ft.; what he does not prove is the fairness of the system as between consumer and consumer. It should, however, be an incentive to additional consumption, seeing that the relation of the fixed charge to consumption must diminish with every 1000 c.ft. used.

Protection!

The best policy of protection the gas industry can adopt is the maintenance of gas consumers' appliances.

Therm Standard Prices.

The Public Control Committee of the London County Council have recommended that application be made to the Board of Trade for an Order to reduce the standard price applicable to the Commercial Gas Company. Next Wednesday, the inquiry opens respecting a similar application as to the standard price of the Gas Light and Coke Company.

To the President of the Société Technique.

M. le Président has brought a blush to our cheeks. Glancing through the first instalment of his report on the Birmingham Exhibition as published by our contemporary, the "Journal des Usines à Gaz," we find the following: "The Exhibition contained a considerable variety of lighting appliances. This outlet for gas will certainly develop no more, but its importance is such that the English gas engineers are seeking, by every means at their disposal, to avoid its diminution. Accordingly, gas-lighting fittings have been improved especially as regards their exterior design, in order to make them as fascinating as electric lighting appliances." We can assure M. le Président that he does not here reflect the mentality of the best and most successful—in fact, the majority of—gas engineers in this country. We could call his attention to many excellent presentations of the lighting-load case, which have been published since Dr. Carpenter's brilliant contribution to the 1921 meeting of the Institution of Gas Engineers. We would

respectfully remind M. le Président that at the present time the British gas industry is seeking reinforcements to protect the lighting load, perhaps by free maintenance; we have the temerity to call attention to the four objectives which have been marked out for conquest in the French centenary and jubilee campaign next year [see p. 376], and to ask whether, in the President's view, the above statement is pro or anti gas. In the anxious days which followed the German attack of March, 1918, the allies were stimulated by that historic order-of the-day: "The British Army is fighting with its back to the wall." Let the French gas industry at least stand with its back to the wall; if it is breached, complete possession of the Channel Ports of Lighting will be a wonderful acquisition and jumping-off point for our colleagues' adversaries.

Electric-Cookers.

The electricity supply industry is very anxious to develop its domestic business; and it would rather have the cooking part than the seasonal and spasmodic heating load. General heating by electricity is much too expensive to gain for it any popularity among the mass of the population. In connection with cooking, electrical engineers have ever-present in their minds the difficulties which interpose themselves along the path of progress; but there are very few of them who care to say anything about those obstacles. In answering some questions at a recent lecture at Eastbourne, the Corporation Electrical Engineer (Mr. J. Kemp Brydges) was not so reticent as some of his fellows. He expressed the opinion (despite the insecure foundation) that the electric cooker is coming to the fore; the "coming" is at funereal pace. He admitted that its cost, "as a stove, was so far about double that of others, and this from the commercial point of view was a drawback." But he is a great believer in its merits; and he also has faith in the statements of that ancient (though not always accurate) lady, Mrs. Beeton, regarding the shrinkage of meat by different heating processes. Of course, Mr. Brydges did not say (but we should like him to do so) why, if equal temperatures are used, in a gas and electric oven, meat cooked in the former should so misbehave itself as to lose more weight than if cooked in the latter. He also said there were forty or fifty electric cookers in use in Eastbourne, and they are a great success. If, after twenty years' propaganda, there are only forty or fifty electric cookers at work in a cleanly, hygienic town like sunny Eastbourne, the prospects, it seems to us, are not exactly rosy. We find in the half-yearly accounts of the Eastbourne Gas Company that they have 10,402 gas-stoves out on hire, to which should be added at least several thousand privately owned gas-cookers. And this after twenty years of electrical propaganda on behalf of electric cooking!

Progress of the Home Dye Industry.

The British Dyestuffs Corporation have from time to time been subjected to an immense amount of criticism. They may have made mistakes; but whatever has been done in that way has had an overwhelming contra in the difficulties that the Corporation have had to encounter. In face of these difficulties, no one can say they have not done well. Attestation of this is supplied by some figures given, by Dr. A. F. de Monilpied (who is associated with the Corporation), in an address at the London Rotary Club last week. When it can be claimed that the Corporation have now on the market some 1400 different colours, this must be admitted to be fine work. When we contrast how our home requirements are now being supplied compared with pre-war, then again there has to be admission that the Corporation have shown good activity. In 1913 Germany made 83 p.ct. of the world's total production of dyestuffs, and we imported 90 p.ct. of our requirements from abroad. To-day, as a result of the war and of Government action, the home industry can and do supply 80 p.ct. of our needs. The dyes are equal in fastness and brightness to German dyes. This is distinctly good testimony.

The Miners' Demands.

The Miners' Federation have notified the Mining Association of their views regarding a larger allocation of surplus profits to the miners as a reward for their labour. It is submitte d: (1) That standard profits shall be 13 p.ct. of standard wages instead of 17 p ct. (2) That the surplus after meeting standard costs shall be divided between wages and profits in the ratio of 87 to 13 instead of 83 to 17. (3) That the minimum wage shall be standard wages *plus* 40 p.ct. thereof, instead of standard wages *plus* 20 p.ct. thereof. (4) That further information as to costs other than wages should be given, particularly in relation to items about which a difference of opinion might arise as to whether they are properly chargeable to capital or to revenue. It will be remembered that the Mining Association intimated that when the demands of the Federation were formulated and before them, they would also present some modifications which they consider desirable from their point of view.

WILLIAM HOOKER BRADLEY.

REGRET was general throughout the gas profession in this country, when, in the very early part of last year, we had to announce the sudden death of Mr. William H. Bradley, the veteran Chief Engineer of the Consolidated Gas Company of New York, and a leader of the gas industry in the United States. The memory of him—and it is a kindly one—still remains with those who were fortunate enough to know him personally; and they will be glad, as we ourselves are, to find that an account of his life has been prepared, with a number of personal photographs, in the form of a handsome booklet.

In the "JOURNAL" for Feb. 8, 1922 (p. 313), some of the main incidents of Mr. Bradley's life were recounted, and these are set out in greater detail in the booklet, the receipt of a copy of which we gratefully acknowledge. It is a record of hard work, conscientiously and ably performed. Born in New Haven (Conn.), in 1838, he had reached the ripe age of 84 when he died—full of years, and full of honour. We learn that as long ago as 1865 Mr. Bradley was engaged, as Superintendent of Construction, at the Continental Iron Works, Brooklyn, in supervising the building of coal-gas plants in many cities and towns; and in this line of work he continued until 1877. His experience, even at this time, was of a varied character. For example, in 1874 a foreign promoter had induced some New York business men to finance the construction of an experimental plant for the manufacture of oxy-hydrogen gas, and the Municipal Oxy-Hydrogen Gas Company of the City of New York was organized. The process was alleged to be a great improvement upon the coal-gas system then in universal use; but Mr. Bradley ultimately demonstrated its impracticability. About the same time, however, M. Tessie du Motay, a Frenchman, had developed a system of manufacturing enriched water gas, which promised commercially successful results; and the Company just named was re-organized under the title of the Municipal Gas Light Company, and embarked upon the construction of a carburetted water-gas plant. The design and construction of this were carried out by Messrs. Rowland and Bradley; and eventually the improved plant was recognized, not only as being safe to operate (a point upon which much doubt had been felt by the workmen), but also as being more economical than the coal-gas process. Mr. Bradley's achievements in the development of the water-gas machine were notable. Such, indeed, was the success achieved that in 1877 Mr. Bradley resigned his position with the Continental Iron Works, and became the Engineer of the Municipal Gas Company—a serious competitor with the older undertakings—and ultimately adopted entirely the Wilkinson process, which closely resembled the Tessie du Motay plant.

Ultimately, passing through various stages, competition led to combination, and Messrs. Harrison E Gawtrey and William H. Bradley laid the solid foundations upon which the Consolidated Gas Company of New York was built up. On Jan. 1, 1886, Mr. Bradley was appointed Chief Engineer of the Company, every Department of which bears striking evidence of the working of his fertile brain. He foresaw the increased demand that would arise for gas, and recognized the advantages of providing for this increased demand by the construction of a large central station at some suitable place other than on Manhattan Island. The eventual outcome of this was the now world-famed Astoria plant, into the design and construction of which he put his whole heart and soul. On Dec. 3, 1906, he charged the first retort at the Astoria works, and the manufacture of gas began in the plant which he had visualized twenty years before. Four years later, following his original plan, the construction was commenced of a large tunnel under the East River; and in 1915, after great difficulties had been encountered and overcome, as recounted in the "JOURNAL" at the time, gas was sent from Astoria through the mains in this new tunnel.

Mr. Bradley possessed many characteristics, but one of the most remarkable of them was his unbounded faith in the future of the industry which he had done so much to develop. He died, as he had wished to do, on duty, and still active in the industry which he had served so long and so faithfully. On Jan. 18, 1922, while seated at his desk in the Company's offices, he passed away, in the midst of the work he had loved so well.

At a meeting of the Royal Society of Arts on Wednesday, Nov. 28, Sir Henry John Gauvain, M.A., M.D., M.Ch., will deal with "The Effect of Sun, Sea, and Open Air in the Treatment of Disease." The Rt. Hon. Arthur Neville Chamberlain, M P., is to preside.

PERSONAL.

The Council announce with regret that, through break-down in health, Dr. P. LONGMUIR has had to resign the post of Director of Research to the British Cast-Iron Research Association, to which he was appointed in October last year. Dr. Longmuir has for some time been very ill, following a severe attack of influenza.

As a result of a recent series of by-elections at Drighlington, consequent on the voluntary resignation of five Urban District Councillors and their submission to the electorate, all but one were defeated by new candidates. The retired councillors included Mr. FRED SCHOFIELD, the Gas Manager.

Mr. ELIJAH STACKHOUSE, Chief Gas Collector to the Walsall Town Council, has been with the Corporation for 52 years, and will retire on March 31 next. In view of his long, faithful, and efficient service, the Gas Committee propose that he shall be paid £200 per annum for life; it being understood that he will render to the undertaking such service as he may be called upon to do.

OBITUARY.

Mr. GEORGE WILLIAM GROSVENOR, D.L., J.P., whose death has occurred in his 78th year, was prominent in every department of public life in Kidderminster. He had been on the Board of the Kidderminster Gas Company for 53 years, and as Chairman of Directors presided at the meeting a few weeks ago. For a great many years he was in the Town Council, and he was the oldest Magistrate on the Borough Bench, in addition to being Chairman of the County Bench.

The death has occurred of Mr. F. O. O. CHUBB, Chairman of the Wells (Somerset) Gas Light Company. Though he had been ill for several months, death took place suddenly on the 23rd ult. Mr. Chubb rendered useful service in connection with the gas industry, and his loss is deeply deplored.

ELECTRICITY SUPPLY MEMORANDA.

NOT long ago we were commenting on the fact that the electricity supply industry was not, generally speaking, making any particular efforts in the direction of stimulating the heating business.

The Fire Season.

There are fairly good reasons why some of them are not doing so. A seasonal load, and one variable wit hin wide limits cannot be very attractive to electricity undertakings; and little wonder that there is less enthusiasm in this direction than formerly. The manufacturers, too, have not been pleased over the small amount of encouragement they have been receiving. Nevertheless, some of them have been engaged in adding a few new patterns to those previously existing. But there has not been much done in this way, other than in the light sheet-metal type of casing; but the illustrations show that, when new, they are quite attractive looking, and the description of the finishes discloses a good range. The prospect in regard to durability is another matter; and we are afraid that some of them are too flimsy for the British idea of what a fire should be like. There is one newcomer of circular form for all-round heating. This is fitted with six elements, each of 500 watts loading. This would mean in "fuel" use 3 KW. per hour, which at 2d. per unit would cost 6d.; and multiplied by the hours of use per cold day, this would be expensive. However, in the "Trade Talk" notes in "Electrical Industries" we read that it is found that demand is steadily veering to the better class electric fires, and that less is being done in the horribly plain black enamelled cast-iron ones. The conclusion is drawn from this that possibly the public, having found electric fires reliable, are willing to pay more money for them. That does not strike us as the opinion of one who searches for reasons below the surface. We should say that the change in the character of the demand—if actually a change—shows that the people who constitute the greater part of the community, and have to look to getting good value for money, are not attracted by electric heating, and that it is the few who have money to spend prodigally who are "steadily increasing" the demand for the better class of electric fires. These people, too, have found that there is something fictitious about the asserted heating value of the small types that have been recommended to them; and so they, having gone to the expense of providing the necessary wiring and fittings, are going to try their luck with larger sizes. They will find an improvement in the heating, but not in their accounts for current. The same writer urges that the electric fire makers should not fall into cutting their prices for this class of business. He warns them that "if they do, they will get into the same plight as the gas firms did a few years ago when the profit on each fire or cooker was almost negligible—a condition of affairs since remedied by co-operative action—I understand." What he "understands" is not exactly the truth. The "gas firms" will be interested to learn that they were in (we take the writer to mean) a sorry plight a few years ago; and the writer may be enlightened by the statement that there is sufficient keen competition in the gas-heating appliances industry to reduce to senseless meaning the words "co-operative action."

Merchandizing Fires.

Writing of electric fires reminds us of an article on the subject by "Spectator" which recently appeared in the "Electrician." "Spectator" appears to be a gentleman with a strong pro-retailer tendency and an anti-electricity supply authority one—at any rate, in connection with this particular subject of electric fires. Despite what is said in the preceding paragraph, this observer apparently finds in the industry an all-round indifference to electric heating. We do not know what other construction is to be placed on his assertion as to, first, the difficulty of convincing the contractor and the retailer that there is a large market for electric fires; secondly, the accusation of lack of enterprise on the part of the electricity supply authorities; and, thirdly, the need of revision of the policies and methods of the electric fire manufacturers. He declares that there is undoubtedly a large market for these fires. If this is so, the receptivity of the market is not noticeably apparent; if the market was so large and receptive as is professed, then the electricity industry must be, if the business is worth having, well equipped with a lot of foolish persons who are blind to what is waiting for their occupation. Why has the field not been cultivated? Whatever may be said by electrical writers on the subject, the fact that there is not a large occupation of the field is not due to the want of effort, but to circumstances over which the industry has no control. Electric fire manufacturers, contractors, and retailers, cannot alter the inherent difficulties of the electricity supply industry in respect of spasmodic loads and low heating value (compared with other fuels) for the money expended. However, "Spectator" does not embrace these matters in his considerations. He has regard only to the merchandizing of fires, and not to the question of primary importance—the merchandizing of electrical energy. He is of opinion that the competition of the electricity supply authorities, with their trading rights and hiring-out powers, has a retarding effect on the exertions of the retailers of electric fires. But he does not see why this should be, seeing that "in hardly any other industry is the hiring system or the hire-purchase system so well established as in the gas industry, and yet the retailers secure a large business." He asks those who doubt his statement to explore any "High Street," and see how numerous are the gas fires, and how few are the electric fires in the windows of the retailers. That is a question of demand, and demand is largely the product of the value obtained for money—not only in the article itself, but in its subsequent use. However, the writer holds it to be a truth that so long as retailers ignore the merchandizing of fires, so long will the supply authorities continue to make the fire business their pet hobby, to develop or hamper as they please. Supply authorities who persistently hamper the development of domestic heating, he asserts, are common enough. He incidentally states that incapacity of mains, and the high cost of renewals, are the most usual excuses. This is followed by the argument that the "supply authorities have a duty to perform to the electrical industry as a whole, as well as a duty to the public." Have they not also a duty to themselves? We think so. Their duty is not to take on a load which is not beneficial to themselves, and therefore to their existing customers. And we have yet to learn that duty involves the palming-off on the public of a system of heating which is so much dearer than any other labour-saving and non-smoke producing one. It is clear that there are men in the electrical industry who will not look squarely in the face the facts relating to this heating business. They think it is all a question of the terms of sale granted by the manufacturers to the retailers, and of the want of encouragement by the electricity supply authorities. There is something more than that; and the critics should try to extend their vision.

Coincidences!

Our electrical contemporaries are constantly indulging in invective against those newspaper reporters who state in their accounts of fires that "the cause is attributed to a defective electric circuit," or that "it is supposed a short circuit started the fire." The number of fires, too, in which the cause is said to be "unknown," it seems to us, has been increasing of late. Other reporters are now showing further originality. Not long since we saw an account of a fire at a wood yard, in the course of which it was stated that electrical machinery (which was totally destroyed) had recently been installed. Lord Wharton's mansion, Halswell Park, near Bridgwater, was practically consumed by fire the other day. One Sunday newspaper informed its readers that electric lighting had been recently installed. Other papers declared that the cause of the outbreak was "unknown." Special articles have lately been appearing in our electrical contemporaries regarding all-electric houses at Hackney. An evening paper last week announced that Hackney had been in darkness (save where gas is used) through the failure of the electric supply for some twenty minutes.

Dissatisfaction.

Mr. R. Hardie, of the Glasgow Electricity Department, recently read a paper before the engineering staff on the "Domestic Uses of Electricity." The Department are getting their officials of all grades to adopt electrical appliances, with the objects of gaining an intimate knowledge of their uses, and of inducing

them to do missionary work among their circles of friends, acquaintances, and neighbours. Mr. Hardie is all out for developing domestic electric cooking and heating. He refers to it as "obviously the line of least resistance." If it is so, then the resisting power of the other parts of the electrical business must be enormous. If "obviously the line of least resistance," why has it not been developed at a faster rate, and the results made obvious by a bulky presence? The statement is a singular one, in view of the facts before us. He also tells us that in the United Kingdom only about 17 p.ct. of the people use the electric light; while in the United States and Canada, the proportion is 36 and 38 p.ct. But these people do not, as a rule, live in electric homes. In addition to electric lighting, they may have an electric iron; but in the majority of cases they use gas for cooking, and in a smaller measure for heating. We should like to call Mr. Hardie's attention to the point that the development of gas cooking and heating to the present large dimensions has occurred simultaneously with the efforts of the electrical people on behalf of electric cooking and heating. Mr. Hardie thinks there should be a large turnover of patronage from gas and coal to electricity. We all know how wasteful coal is for cooking and heating, owing to the fact (without taking into account labour involved) that coal fires have to be maintained for intermittent use. Therefore, when Mr. Hardie contrasts coal and electricity, he is comparing things which are not really comparable; and yet, with all the waste occasioned by coal, an electrical expert such as Mr. Hardie can only in his own household (where electricity is no doubt used most economically) show a few shillings saving in a year, over houses where the heating, other than cooking, is done by coal. And this says nothing about the initial expenses of electrical installation and appliances. This is what he says in this connection: An analysis of Glasgow domestic consumers' accounts indicates that in a one room and kitchen house, the average electric bill was £1 9s. 4d. per annum; in a two room and kitchen house, £1 18s. 3d. per annum; and in a three room and kitchen house, £2 17s. 3d. per annum; and so on. The Director of Housing recently furnished him with the all-in running costs of a typical five-apartment house in Glasgow; and the proportional expenditure on electricity, gas, and coal might be taken as a fair average of the ordinary house. The figures were: Electricity for lighting, £2 12s. 3d.; gas for cooking, £5 18s. 6d.; coal for heating, £8 19s. 7d.; firewood, £1 7s.—total, £18 17s. 4d. Mr. Hardie submitted that there is something wrong with the allotment to the various services. The electricity department gets 1s. per week, the gas department 2s. 3d. per week, while the coal merchant and firewood man get between them 4s. per week. Electrical men ought not, he holds, to rest content until they readjust the proportion in their favour—say to the figures obtaining in the twelve months just ended for a similar house occupied by himself, in which the cost of electricity was £13 17s. 7d., and coal £4 11s.—a total of £18 8s. 7d. In the one case the Electricity Department had a revenue of £2 12s. 3d., and in the other of £13 17s. 7d. He says it follows that, if electrical men could succeed in having the use of electric cookers and fires made general, the present revenue from domestic consumers would be multiplied by five or six. There is much virtue in the "if." We have no doubt the Glasgow Gas Department will not drop their endeavours to maintain, to the advantage of the citizens of Glasgow, the more economical commodity for both heating and cooking.

Private Generating Plants.

Gas men are getting deeply interested in private generating plants. Some gas undertakings have had long experience of them; others are now only entering into the business; while still others have hardly given a thought to the competitive value of such plants, where in large houses and business establishments or factories, electricity is required by the owners for both lighting and power. "Megohm" in the "Electrical Times" has drawn attention to a somewhat common mistake—that the Electricity Commissioners' consent has to be obtained before a private generating plant of over 50 KW. capacity may be erected. The Commissioners have no power to prevent the installation of plants for the supply by an individual or firm of his or their own premises. The consent of the Commissioners has to be obtained to the extension of a generating station or main transmission line; but this restriction, says section 11 of the Electricity Supply Act of 1919, "shall not apply to the establishment or extension of a private generating station." So long as the current is used for private purposes, and is not sold, a private station may be built of any capacity. There is, however, a proviso to section 11, which enacts that, in the case of the establishment of a new private generating station, the owner shall comply with any regulations made by the Commissioners as to the type of current, frequency, and pressure to be used, but such regulations are to be so framed as not to interfere with the economical and efficient working of the business for which the supply is generated. "Megohm" says he has never heard of a case in which the Commissioners have not accepted the scheme propounded, if the plant is genuinely of a private nature.

Large Sets and Thermal Efficiency.

In the Inaugural Address of the new President of the Institution of Electrical Engineers (Dr. Alexander Russell), he stated that the thermal efficiency in large power stations has almost doubled during the past few years. To-day he says there are power stations in different parts of the country with a thermal efficiency of 18 p.ct.; and he predicts that 25 p.ct. may be attained in the not very distant future. This refers to large power stations with big generating sets; but the average thermal efficiency of electricity generating stations, taking the country through, is admittedly very poor. Speaking at Hackney recently, the Hon. Sir Charles Parsons (than whom no one can claim to be a higher authority on the subject) referred to the big stations of America. He stated that from long experience in the manufacture of all sizes of generating plant, and in the management of electrical companies, he had no hesitation in saying that there was, comparatively speaking, only a small gain in economy in coal resulting from the use of gigantic engines, and that their successful use is dependent upon special circumstances which have so far rarely existed in any country but America, which favours large stations. There is no question that the most important factor in producing cheap electricity is diversity of load. One of the principal means of increasing the diversity of load is, in the opinion of Sir Charles, the fostering of domestic demand. That is what many electrical men say; but the public are not readily responsive to the invitation to increase their domestic load for the benefit of electricity stations.

GAS IN FRANCE.

Jubilee of the Société Technique.

French gas engineers have decided next year to celebrate the centenary of the gas industry and the fiftieth birthday of the Société Technique de l'Industrie du Gaz en France. A Committee of Organization has elaborated a most attractive programme, the objects of which are:

1.—To emphasize the part France has played in the development of the gas industry, having regard to the preceding displays at Birmingham, Amsterdam, and Zurich.
2.—To enhance the value of the ordinary Congress, so as to bring together as many engineers as possible—both French and from abroad.
3.—To institute active propaganda among the French public, "who are ignorant of many of the utilities of gas, as well as of means of employing it economically."
4.—To stimulate the efforts of the French manufacturers of gas plant and appliances.

It is proposed to make coincident the various annual gas meetings, and at the same time to hold an International Exhibition, and to leaven the whole with certain attractive functions. It is also suggested that the Congress shall be open "to our eminent colleagues of the gas industry abroad."

From May 31 to July 15 there will be the exhibition, where not only gas-works plant, but gas-consuming appliances, will be displayed; and a section will be devoted to showing their development from the earliest models. The annual Gas Week will take place from June 10 to 14; and the Congress of the Société Technique will be from June 23 to 28. The latter will be of more than usual importance—a real international Congress—for the members of foreign Associations are not merely invited to attend, but are urgently begged to come forward with communications.

The programme of the Congress, as provisionally fixed, is as follows:

Monday, June 23.—Usual Committee meetings.
Tuesday, June 24.—Morning, general assembly. Afternoon, official opening of the Congress, introductions, and official visit to the Exhibition.
Wednesday, June 25.—Morning, reports of the various Commissions. Afternoon, view of a film presenting the activities of the gas industry. Evening, visit to a theatre or to a garden fête.
Thursday, June 26.—Morning and afternoon, presentation of papers. Evening, official banquet.
Friday, June 27.—River excursion to St. Germain.
Saturday, June 28.—Trip by special train to Douai and St. Quentin.

The Committee are actively engaged in seeking a suitable place for the carrying-out of their programme; at the moment they are negotiating with the Société du Jardin d'Acclimatation, who possess, in agreeable surroundings, a hall suitable for the séances, sufficient floor area for the exhibition, and a restaurant. Throughout the exhibition will be held cooking demonstrations, public discussions, and organized visits, "which will make one corner of Paris a veritable city of gas."

Southern Association of Gas Engineers and Managers.—Two papers will be submitted for discussion at the annual general meeting of the Association, to be held on Tuesday, Nov. 27, at 2.15 p.m., in the Charing Cross Hotel, Strand, under the presidency of Mr. Percy S. Hoyte. Mr. J. S. Thorman, of the Gas Light and Coke Company, will deal with "Waste Heat and Its Insulation from Glover-West Verticals and other Carbonizing Plant," and Mr. Samuel B. Chandler, of the Tottenham District Light, Heat, and Power Company, with "Some Aspects of Distribution." The officers for 1924 are to be elected, and certain alterations of the rules are proposed. Tea will be served at the termination of the business.

RECOVERY OF COKE FROM PAN ASH.—A NEW AND SIMPLE PROCESS WITH CLEAN WATER.—A COMBINED PAN-ASH OR COKE WASHER.

It is safe to say that millions of tons of pan ash are carted annually from gas-works to refuse tips; and the large percentage of coke therein represents the colossal waste of a valuable fuel. It will therefore be of great interest to gas engineers to know that, as a result of experiments carried out over a number of years, a most efficient pan-ash washer for the recovery of this coke, working with a small volume of clean water, is now upon the market, and that, moreover, its small size and low cost place it within the reach of all but the very smallest gas-works.

Messrs. George Waller and Son, Ltd., of Stroud, have, during the past few years, installed at various gas-works most efficient patent coke washers, varying in capacity from 12 to 60 tons per day, and they have recently, under an improved patent, placed at the command of gas engineers a washer capable of washing coke of any density. That is to say, it will wash with equal facility coke produced in vertical retorts or in horizontal retorts where the hot coke is quenched by immersion in a tank of water, or even furnace and coke-oven coke. With all these cokes of various densities the whole of the coke, excepting the dust, is recovered as washed breeze or coke, while the dross extracted therefrom is free from coke. Having solved this difficult question of efficiently washing coke of heavy specific gravity, the process has been carried still further, with the result that a washer measuring but 5 ft. square, and with an hourly consumption of but 30 gallons of water, by an ingenious manipulation of the water therein, is made capable of extracting the whole of the coke in either old or newly-made pan ash, at the rate of 2 tons of pan ash per hour.

A modern gas-works (where the retort furnaces are carefully shaken up and clinkered) producing 150 million c.ft. of gas per annum makes in the region of 750 tons of pan ash; and from this quantity, taken on an average, 340 tons of coke per annum is recoverable. Should, however, the clinkering of the furnaces be performed without due regard to the coke content in the pan ash, the coke recovery would be greater. Not only is this large tonnage of coke recoverable, but the costs incidental to carting and tipping this tonnage are saved.

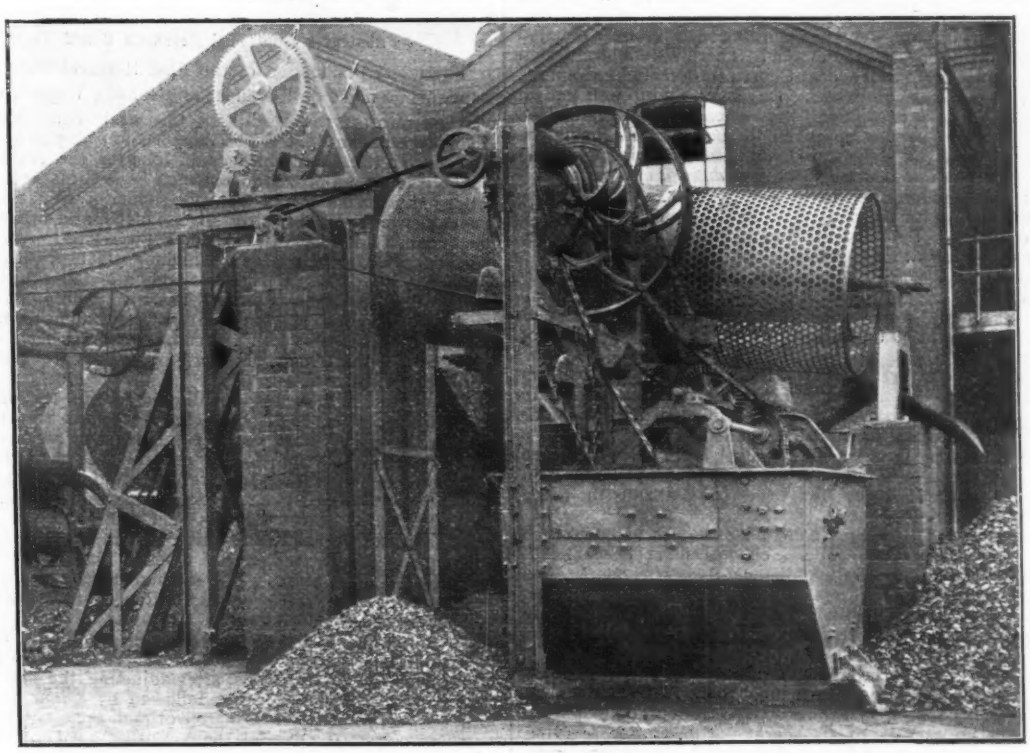
The results being obtained from newly-made pan ash on the plant illustrated below are as follows:

	P.Ct.
Dust (screened through ½ in. mesh and unwashed)	34·2
Clinker	19·5
Coke	46·3
	100·0

The clinker separated contains no coke. The separated coke is of excellent appearance, and admirable for boiler firing or retort furnaces.

It is hard to believe that gas-works can afford to waste from 2 to 3 tons of coke per million c.ft. of gas produced. There is no doubt that a plant of such a concise nature and low cost will repay for its installation in its first year, or nearly so; and it is reasonable to assume that this is still another instance where a huge sum of money will be saved by utilizing a hitherto usually waste product.

The plant is made in various sizes, and is placed on the market by Messrs. George Waller & Son, Ltd., Stroud, by arrangement with the patentee.



COMBINED PAN-ASH AND COKE WASHER AT THE SPENBOROUGH (CLECKHEATON) GAS-WORKS.

COVENTRY VERTICAL RETORT RESULTS.

In a foot-note to p. 318 of our last issue, we gave some results obtained in the new Glover-West vertical-retort installation at Coventry. The results were measured, by Mr. Langford's technical staff, over a convenient working period of six days' normal operation, from June 11 to 16 of this year.

The coals carbonized were not all Yorkshire, as previously stated, but a mixture of 57 p.ct. Yorkshire, 38 p.ct. Derbyshire, and 5 p.ct. North Staffs. The approximate analysis of a fair sample of the mixture gave the following result:

	P.Ct.
Moisture	3·5
Volatile matter	27·5
Fixed carbon	63·0
Ash	6·0

We repeat in the table below the average yields.

Make of gas per ton	18,280 c.ft.
Calorific value (gross)	477 B.Th.U.
Therms per ton	86·6 therms
Total weight of coke fed to producers	12·9 lbs. per 100 lbs. of coal carbonized
Net coke for sale per ton of coal carbonized	10 cwt.

Erratum.—Last week's "JOURNAL," p. 325, lines 21-2, in the discussion of Mr. W. B. M'Lusky's paper before the Manchester District Institution—*freshly carburetted water gas* should have been *freshly calibrated anemometer.*

Illuminating Engineering Society.—At the opening meeting of the new session, to be held at the Royal Society of Arts, John Street, Adelphi, at 8 p.m. next Tuesday, Nov. 13, reports on progress during the vacation, and developments in lamps and lighting appliances will be presented, and some novelties exhibited.

AMERICAN GAS ASSOCIATION.

[COMMUNICATED.]

It is half-a-century since a small group of managers and owners of gas companies met in New York City to form the American Gas Light Association. The meeting was called primarily to consider the lesson that might be learned from a recent terrible explosion in a purifying house. So the birth of concerted national action in the gas industry was due to the instinct of self-preservation. To-day, the keynote is *service*—how to make each company as a unit, and the industry as a whole, perform most efficiently its indispensable rôle in the nation's life.

At the fifth annual meeting of the American Gas Association, at Atlantic City from Oct. 14 to 18, there was at least one man who began his business career more than fifty years ago. He had a clear picture of the contrast between then and now. Then, a small group in one room finding that a few hours on several days sufficed for the discussion of all their problems; now, an attendance of 3000, divided into six groups, and yet, after four days, conscious how many important questions remained for solution. A description in detail of all the items on the programme would require more space than you could spare. Therefore, only occurrences of general interest will be noted.

The material welfare of the industry was shown in two striking ways. First, there was the exhibition of 160 manufacturers of gas apparatus and gas-using appliances, requiring 27,000 sq.ft. of space, and located on the celebrated Steel Pier, which extends 2000 ft. from the shore. Secondly, there was the wonderful financial showing of the Treasurer's report, with $260,000 receipts for the year, and accumulated surplus of $100,000 in cash and securities. Truly, our gas industry in this country has "found itself," and each year shows more clearly how much good results from the possession of adequate resources by a trained staff, reinforced by volunteer committees, and all working for, and speaking in the name of, a truly national organization.

As is now the custom, the three morning sessions were devoted to general meetings of the Association. There were addresses on public relations, taxes, and recent Court decisions upon Commission regulation of gas companies. Dr. E. W. Smith, well known to your readers, told us of your experience with the therm [see *ante*, p. 252]. Our nearest approach to such a condition is the recent decision of the Colorado Commission, allowing each gas company to declare its heating value [see *ante*, p. 135].

Commission regulation of our gas companies is such an important feature of our business life that one evening was devoted to a "Public Relations Symposium," where the speakers, who were members of various State Commissions, told of ways to gain public goodwill. Much insistence was placed on proper supervision and remuneration of all employees in direct contact with consumers, so as to ensure for the latter courteous treatment at all times, and thus build up for a company the lasting goodwill of its community.

The address of the President (Mr. R. B. Brown, of Milwaukee) called attention to the substantial present and the wonderful future of the business, to the desirability of standardized methods of gas manufacture and of increased industrial sales to improve the load factor. He gave warning against large sales for house heating with a load factor only one-third the present average, and with demand characteristics that necessitate a rate including more than a commodity charge.

At the general sessions three splendid examples of committee work were presented in the reports on "Accident Prevention," "Rate Structure," and "Gas Appliance Specifications." The first is world-wide in its interest. In the second Mr. Norton H. Humphrys is quoted as the first to call attention to the necessity for differential rates. The third relates more especially to our own conditions.

Another report of great interest was on "Customer Ownership," showing that in the twenty months ended Sept. 30, 1923, 1,251,640 shares of stock had been sold to 227,170 consumer and employee purchasers, or an average of 5·5 shares per purchaser, securing $106,836,000 of new capital well distributed throughout each community at a very low cost for commissions.

The sectional sessions were held each afternoon, and often one could choose between four simultaneous meetings, each in a suitable room, and each filled with an interested audience. Not only does this practice of parallel sessions allow proper consideration each year of more of the industry's pressing problems than would be possible in a series of general sessions, but, what is quite as important, the division into sections ensures smaller gatherings, a greater average interest in the subject discussed, and therefore a better discussion and more rapid progress.

The truth of the above statement has been well shown in our industry by the history of the Accounting Section. Prior to the formation of this section as a part of the American Gas Association, the bookkeepers and accountants of our companies had no place on the annual meeting programme. In consequence, few attended the meetings, and office practice suffered. In five years the Accounting Section has shown the way to great economies in office practice throughout the industry, besides nearing the goal of a uniform system of gas accountancy. The Technical Section discussed many phases of gas manufacture, and listened with interest to the progress so far made in meter standardization, which promises to include fewer sizes than your new schedule. The Commercial Section, and the newly-formed Industrial Gas Section, talked with much profit about the wonderful possibilities for increased gas sales in this prosperous land. The Publicity and Advertising Section found three sessions required to discuss the best methods of informing the public of the past, present, and future position of the industry in community life. The Manufacturers' Section considered gas-appliance specifications and listened to the result of some investigations on containers for merchandize, made by the United States Forest Products Laboratory.

In accordance with custom, the Presidents of the Société Technique and of the Institution of Gas Engineers were elected to honorary membership in the Association. It is an interesting fact that the President of the Association for the coming year is already a member of the Institution of Gas Engineers. The new officers are:

President.—J. B. Klumpp, of Philadelphia.
Vice-President.—C. O. G. Miller, of San Francisco.
Treasurer.—H. M. Brundage, of New York City.
Directors to serve two years.—Messrs. George B. Cortelyou, Donald McDonald, R. J. Hole, C. J. Ramsburg, J. J. Humphreys, A. Hurlburt, H. C. Abell, and C. Paige.

Each section also elected Chairman and Vice-Chairman.

The entertainment features included an informal dance on Tuesday evening, a card party and tea for the ladies on Wednesday afternoon, golfing privileges for everybody at any time, and a Festival Night on the Steeplechase Pier, as a closing frolic on Thursday. Here many well-known faces appeared under strange disguises, and laughter reigned supreme.

We enter the second half-century of our Association activities better equipped than ever before to serve our communities and our nation.

THE STEAMING OF ARLEY COAL.*

Abstracts from Fuel Research Board Tests.

The latest publication of the Fuel Research Board concerns experiments made on the effect of steaming Wigan Arley coal in vertical retorts; the results of this work being presented in Technical Paper No. 8. The Arley seam occupies an important position in the Lancashire coalfield, over the greater part of which it has been proved to exist. The well-marked characteristics and consistency of the coal render it valuable as a geological horizon. It is fairly strong, black, and lustrous, with a mean density of 1·24. In character it is a free-burning bituminous coal of equal value for gas-making, steam-raising, or manufacturing purposes, and produces a good metallurgical coke with a low ash and sulphur content. The results obtained are consequently of importance from this standpoint alone; and it is with interest that we note that the results of similar tests on further coals will be published in this series of technical papers, as they become available.

The scheme of tests adopted allowed for the carbonization of the coal at a uniform combustion-chamber temperature of 1180° C., and for the use of four different percentages of steam—5, 10, 15, and 20 p.ct. It is stated in the report that the scheme would be more complete if a series of results could have been obtained for a "no steam" trial. As experience has shown, however, that the design of the Glover-West retorts at the Station is such as to cause overheating of the bottom castings and worms when no steam is used, it was deemed inadvisable to include such a test in the series. The method of conducting the tests was identical with that set out in the Report of the Fuel Research Board for 1920-21, First Section. In order to obtain as great a range of reliable results as possible with the limited quantity of coal available, the tests were arranged so that two days' preliminary run could be made, after adjusting the setting to the desired conditions; this being followed by a four days' run to form the test proper. As a matter of fact, these conditions were observed only in the case of the test using 20 p.ct. steam, when complications were introduced by the development of a serious leakage in the wall of one of the retorts. After this test, the damaged retort was emptied, and its steam supply blanked off. Carbonizing tests were continued, using the other three retorts; but the temperature conditions could not be made to correspond exactly with those obtaining when four retorts were in use. The whole series of four tests was, therefore, carried out using three retorts only. This system resulted in slightly higher temperatures towards the top of the setting; and differences were found in the data obtained. It is unnecessary to detail the methods of sampling and analysis, but it may be mentioned that an average sample of about 8000 c.ft. of gas—5 to 8 p.ct. of the total made—for each 24 hours' working was collected continuously in a sampling holder; complete analyses and calorific value and specific gravity tests being carried out on each daily sample.

SUMMARY OF RESULTS.

The coke obtained was hard and strong, with a silvery lustre. The decrease in weight of coke caused by increased steaming,

* Fuel Research Board Technical Paper No. 8—"The Steaming of Wigan Arley Coal in Vertical Gas-Retorts." Published by H.M. Stationery Office, and obtainable at Imperial House, Kingsway, W.C. 2. Price 9d. net.

calculated per 1000 c.ft. of additional gas produced per ton of coal, worked out as follows:

Increase of Steam.	Additional Gas Per Ton, C.Ft.	Decrease of Coke Yield.	
		Lbs.	Lbs. per 1000 C.Ft. of Additional Gas.
From 5 to 20 p.ct. (3 retorts) . .	4000	56·3	14·1
" " " (4 retorts) . .	3530	68·3	19·3

These figures compare with 7·1 lbs. in the case of Consett coal (5 to 20 p.ct. steam), 10·6 lbs. in the case of Mitchell Main coal (5 to 20 p.ct. steam), and 21·0 in that of Lanarkshire Main and Ell coal (0 to 22 p.ct. steam).

The coal proved to work well in the retorts so far as handling and carbonization were concerned; though at higher percentages of steam the temperatures in the upper part of the retorts tended to become rather high. This had a bad effect on the ammonia yields; and increased steaming above approximately 10 p.ct. did not result, as might otherwise have been expected, in any additional recovery. The amount of heat required per ton for the carbonization of this coal, including the sensible heat in the products, varied from 13·0 therms with 5 p.ct. steam to 18·25 therms with 20 p.ct. steam. The ash was found to be fusible at 1090° C. That this property is typical of the ash of all coal from the Arley seam is unlikely. The general effect of steaming on carbonization yields may be summarized as follows for increases from 5 to 20 p.ct. of steam:

Steam.	5 P.Ct.	20 P.Ct.	Increase.	
			Actual.	P.Ct.
Gas, c.ft. per ton	15,980	19,980	4000	25·0
" calorific value, B.Th.U. per c.ft.	502	457	−45	−9·0
" therms per ton	80·2	91·3	11·1	13·9
Tar, gallons per ton	13·62	14·73	1·11	8·1
Ammonium sulphate, lbs. per ton . .	23·43	28·57	5·14	21·9

BROADCASTING GAS.

[A lecture which is being Broadcasted To-day by Mr. F. W. Goodenough, Executive Chairman of the "B.C.G.A."]

GAS AS A DOMESTIC SERVANT.

The subject of domestic servants—always of interest to you, ladies, and often of serious personal concern—is very much to the fore just now. May I hope, therefore, that you will welcome a little talk about a domestic servant that is cheerfully at your service day or night; never wants an evening out, or a day off; never grumbles or answers-back; has no followers; and needs practically no supervision.

When I say that this paragon is just the stored-up heat of the sun of bygone ages brought to you in the gas-mains, you may think: "Gas can't *do any work* a servant does; whatever is the man talking about?" May I answer by an adaptation of a proverb? "If money saved is money earned," is it not equally true that "work saved is work done"?

Now gas makes it possible to abolish the work of cleaning grates and laying fires; chopping wood and carrying coals; lighting, coaxing, making-up, and, sometimes, relighting fires; cleaning-out flues; carrying and sifting ashes; and cleaning fire-irons. Again, the dusting required is far less in rooms heated by gas than in those where a coal fire is every now and then stirred up with a poker, and from which a grate-full of ashes has to be raked out every morning. It is because all this is true that gas has been christened: "Mother's Third Hand."

Someone said truly: "We don't value water until the well runs dry." I wonder if the many who enjoy the advantages of gas—for cooking; for heating water for washing-up, for the bath, and for all other household needs; for warming their rooms; and for laundry purposes—realize how much more work there would be to do if the gas supply suddenly "ran dry"—how much less time for recreation, for giving to their children, and for useful civic work. Have those who still use coal for these purposes any idea how much the house-work would be lightened if they called in "Fairy Gas" to their aid?

Those worried by the domestic service problem might well give attention to this question of gas *versus* dirty drudgery, and consider how much more serious the problem would have been if no gas cookers, water heaters, or fires had been forthcoming. How much less serious it would be if everyone made the fullest possible use of gas, how much cleaner the air of our cities would be as a consequence, and how much more cheerful and healthy the inhabitants. Do you remember what wonderful views we got, and how extraordinarily low the death-rate was in London during the coal stoppage two years ago, because we were not sending up smoke to shut out the sunshine and obscure the distant hills, but were making free use of the gas service that never failed?

How many realize the danger, to our children and old folk, of smoky fog, which has been known to kill hundreds in a week? But I must not spend time enthusing on the subject of gas as a preventive of the diseases fostered by fog and darkness. I do want, however, to point out another way in which gas is a special safeguard of the health of the young and the old. Children's ailments sometimes come on with startling rapidity, and yield with equal rapidity to treatment by a hot bath or hot food. If gas is available for providing either at the shortest possible notice, a mother's anxiety about her children is greatly lessened. How much better can the kiddies be safeguarded against chills if there is a gas-fire in both the day nursery and the night nursery, ready to provide cheerful warmth at the shortest possible notice. So it is with our old folk. Our family doctor said years ago that more chills were caught by elderly people through leaving a warm sitting-room to take off their warm clothes in a cold bedroom, and get into a cold bed, than in any other way, and that for this reason he strongly advocated gas-fires in every bedroom.

There is the answer to the question which some may be asking: "Are gas-fires healthy?" The opinion just quoted has been endorsed by thousands of doctors from personal experience, and by "The Lancet" as the result of scientific investigation, with the result that to-day the heaviest gas consumption per acre in London is in the Harley Street-Wimpole Street area. Thousands of gas-fires are to be found in the houses of our leading physicians and surgeons, in nursing homes and in hospitals. That is a sufficient answer to any query as to the healthiness of gas heating.

After all, what is a coal fire but a gas-fire in which the gas is burnt unpurified, or a gas-fire but one in which the purified essence of coal is burnt, while all the valuable chemical constituents of coal—dyes, drugs, disinfectants, and so forth—have been retained at the gas-works, which, in the case of a coal fire, go up the chimney to befoul the air without? Gas, therefore, is not only a saver of work, but a saver of health in every home where it takes the place of coal.

Now there are a few questions that some of my hearers would put if they could "talk in" as well as "listen." Some would ask: "Is gas economical for cooking?" Others: "How can I best get hot water if I no longer use the kitchen coal range?" "Are gas-fires costly to use?" "How can I prevent waste of gas?" "What is a therm, and why is gas now charged for by the therm instead of by the thousand cubic feet?" If I were to answer these questions fully, as I should be delighted to do, I should be talking to you for an hour, so I can only promise to reply to them, either by further talks later on if desired, or by correspondence.

The British Commercial Gas Association (of which I am Chairman) represent the gas industry as a whole—and not any particular corporation, company, or firm—and are prepared always to give any housewife the fullest possible information, which will enable her to get the utmost value from every pennyworth of gas used. You have only to write to the Secretary, care of the British Broadcasting Company, No. 2, Savoy Hill, to get any help or advice you need. The policy of the Association is based on the truths that the most economical appliances sell the most gas in the long run, and that the satisfied customer is the best salesman of all.

Such a customer was the lady who recently placed a bunch of pansies on the bust of Murdoch at the Birmingham Gas Exhibition, with a card bearing these words:

> "Pansies for thoughts—from a woman—one of millions who are grateful for the boon of gas, and think kindly of its discoverer."

We of the gas industry who believe in good service as the first principle in business are very proud of that tribute. May I leave it as the last thought in your minds, and say "Good Night and Thank You."

The "Efficient" Silent Burner.

If the claims put forward for the "Efficient" Silent Burner can be substantiated in independent practical working, then its introduction by Burners (1921) Limited, of Bromsgrove, marks a distinct advance in gas-burner construction. Many of us have doubtless experienced a "hissing" burner, due to the incomplete combustion of air and gas, remedied by adjustment of the air supply to the burner; and some of us may have known adjusters to stick fast and refuse to be manipulated. In this connection, it might be as well to mention in passing that Burners (1921) Limited claim to have overcome this by their new screw air-collar. We are now promised a burner—the "Efficient" Silent Burner (having no air adjuster, because no air adjustment is necessary), which will operate successfully on all qualities of gas and all pressures above 17·10ths. A sample of this burner, it will be remembered, was exhibited on the firm's stand at the recent National Gas Exhibition in Birmingham, and attracted the attention of many gas engineers. We understand that the Company are now in a position to supply the burner in large quantities; and, assuming, of course, that the claims made for it are substantiated—we have no reason to doubt this, since we are informed that it was submitted to test under all conditions of gas and pressure for some time prior to exhibition—there should be a good demand for the burner.

Tynemouth Gas Order.—A full report is in type of an inquiry by Mr. H. C. Honey, at the offices of the Board of Trade, last Friday, in connection with an application by the Tynemouth Gas Company for a Special Order under section 10 of the Gas Regulation Act, to confer upon them various further powers. It is, however, necessary to hold over the report until our next issue.

DUMBARTON'S GAS SUPPLY AND NEW WORKS.

The Inaugural Ceremony.

ON Friday, the 26th ult., the Ancient and Royal Burgh of Dumbarton was *en fête*, the occasion being the inauguration and formal opening of the town's new gas undertaking.

In 1832 the first Dumbarton Gas Light Company was formed, authorized to raise £1000 of capital. The undertaking prospered under private management for some forty-two years, until, in 1873, the Town Council acquired it by special Parliamentary authority embodied in "The Dumbarton Corporation Gas-Works, Pier, &c., Act." It is exactly fifty years since the date of transfer from the private Company to the Corporation. During recent years, it was with the greatest difficulty that sufficient supplies were maintained to meet already existing demands. Increased storage and plant extensions were urgently required to keep pace with the increasing output; and, in view of the restricted nature of the original site in Castle Street, the Town Council found it necessary to proceed with the erection of a new gas-works. The planning and entire supervision of the scheme was entrusted to Mr. James Bell, of the Company. The new site on Dumbuck Estate comprises an area of ten acres. This will amply permit of any further additions to carbonizing plant or gas storage which may be necessary to satisfy the future needs of the town. The site has been well chosen for its admirable railway facilities.

THE OPENING CEREMONY.

Crisp and clear October weather favoured the inaugural ceremony, which was attended by a large and representative company, including members of the Dumbarton Town Council, representatives of the industrial interests of the burgh, and managers and others associated with gas undertakings in different parts of Scotland.

Following the formal opening ceremony, performed by Mrs. Garrick, wife of Provost Garrick, the company made a tour of the works under the guidance of the Provost, members of the Town Council, and Mr. James Bell. The visitors appeared to be favourably impressed with the suitability of the works, the general plan and arrangement, and the modern plant equipment for the production of gas on a considerable scale.

In the planning of the works, probable future requirements have not been overlooked, and any extensions or additions that may be considered necessary can readily be undertaken.

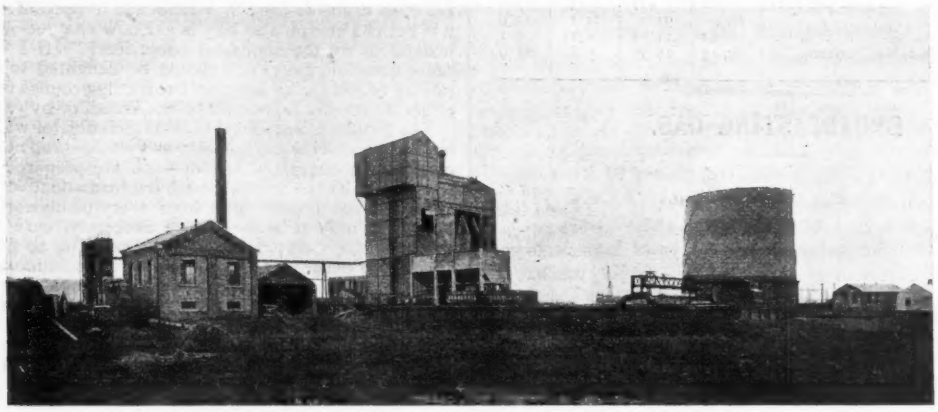


Fig. 1.—General View of the Dumbuck Gas-Works.

THE NEW DUMBUCK GAS-WORKS.

The contract for the erection of the carbonizing plant, with the whole of the coal and coke handling plant, was entrusted to Messrs. West's Gas Improvement Company, Manchester, who have installed two settings of their well-known Glover-West vertical retorts, with a nominal capacity of three-quarters of a million c.ft. per day. Taking into account the proximity of the river, and the fact that the site was known to have been part, in former days, of an immense marshy area, it was necessary to pay special attention to the design of the foundations. In January, 1921, bore holes were sunk in the vicinity of the proposed retort-house and breaker pit. As a result of these borings it was decided that pile foundations should be adopted generally, as being the most suitable and economical for the nature of the ground disclosed. The design of the foundations, together with that of the coke hoppers, was placed in the hands of Messrs. Mouchel and Partners, London, who placed the actual carrying-out of the work with their licensed contractors—Messrs. McBride, of Glasgow. First it was decided to sink a trial pile. The test commenced in June, and observations were carried on until well into July. The trial pile used was 12 in. square and of pitch pine, and was driven to a depth of 58 ft. 8 in. The pile was left at this depth for several days with the 35 cwt. hammer resting upon it. It was then driven again; and the movement due to ten two-foot blows only amounted to 1¼ in. Still further driving took place; and the 59 ft. 6 in. long pile was finally driven with the head 8 ft. 9 in. below ground level, giving a total depth of 68 ft. 3 in. Following these extensive observations a pile and raft foundation was designed to take the weight of the retort bench, and piles alone for that of the coal store and breaker pit. A total number of 94 piles were driven. These are of concrete 14 in. square, reinforced on the Hennebique system, and fitted with the usual design of metal point. The design of the coal-breaker pit, which is 21 ft. deep in part, involved some very interesting calculations; the pit being designed as an empty tank capable of resisting pressure on the walls due to an assumed submersion in a semi-liquid.

COAL-HANDLING PLANT.

The coal-wagons are handled on the gas-works sidings by a petrol locomotive made by the Kilmarnock Engineering Company. Its total weight is eight tons. The engine is a 40 B.H.P. water-cooled, internal-combustion motor of the four-cycle type, having four cylinders. The locomotive is fitted with a patent change gear, providing two speeds in both directions; the gearbox being completely enclosed, and running in oil. From this gearbox heavy roller chains take the drive to each axle. The clutch is of the inverted-cone type, provided with back stop springs to facilitate gear-changing. At three miles per hour the locomotive is capable of hauling on the level 146 tons, and at nine miles 48 tons. The coal wagons are hauled into position over the coal-breaker pit, and there tipped by means of a set of Waller's electrically-driven hydraulic wagon-tippers. The coal is delivered into a 10-ton receiving hopper. From this hopper it is regularly delivered by an adjustable-stroke reciprocating feeder into a West double-claw coal breaker, capable of handling 30 tons of coal per hour, breaking it to the size suitable for the carbonizing plant. It is then passed to a rotary filler, which supplies the requisite amount of coal to each bucket of the gravity-bucket conveyor. The latter elevates and conveys the coal to the overhead bunkers of the retort bench at the rate of 25 tons per hour. This conveyor is manufactured throughout by Messrs. West's Gas Improvement Company, and is complete with their well-known stamped steel, renewable bushed chains, fitted with oil-retaining runner wheels, pressed steel buckets made by the West special cold-pressing process, with tipping cams, sprocket wheels of special cast iron, steel shafts, bearings, and tension and driving gear.

The coal store is designed to contain about 750 tons of coal. It consists of a brick building without roof, and the walls are suitably braced to withstand the pressure of the coal. The foundations for the walls are carried on nineteen reinforced concrete piles: the pile caps being connected by tie beams, arranged below the level of the floor. Coal is supplied to the store by way of three steel shoots extending from the coal bunkers above the retort bench, through the retort-house wall, to the centre of the coal store, finishing at a suitable height to give the required capacity. The coal is tipped into the shoots from the gravity-bucket conveyor by means of dumping gears operated from the conveyor platform. Each shoot is fitted with a special swing door, near the bunkers, operated from the same platform. An auxiliary to the coal plant is also provided for. Coal can be wheeled in side-tipping wagons on rails from the coal store across the retort-house to the lift, whence it may be elevated to the bunker level, where the wagons can be run on rails along the conveyor platform, and the coal tipped into the bunkers as required. To by-pass the breaking machinery alone, coal may be taken direct from the coal store in side-tipping wagons and dumped through a grid of suitable mesh down a shoot and thence to the gravity-bucket conveyor.

The retort-house is of the usual Glover-West design. The

retort bench contains two settings of sixteen Glover-West vertical retorts for continuous carbonization; each setting containing four units of two retorts each, heated by one producer to two units, and each provided with an independent chimney.

COKE-HANDLING PLANT.

The coke is discharged from the mouthpieces into side-tipping wagons running on rails under the bench. These are hoisted to the level of the outside gantry, on which they are wheeled to the reinforced concrete storage hoppers. The latter are built in three

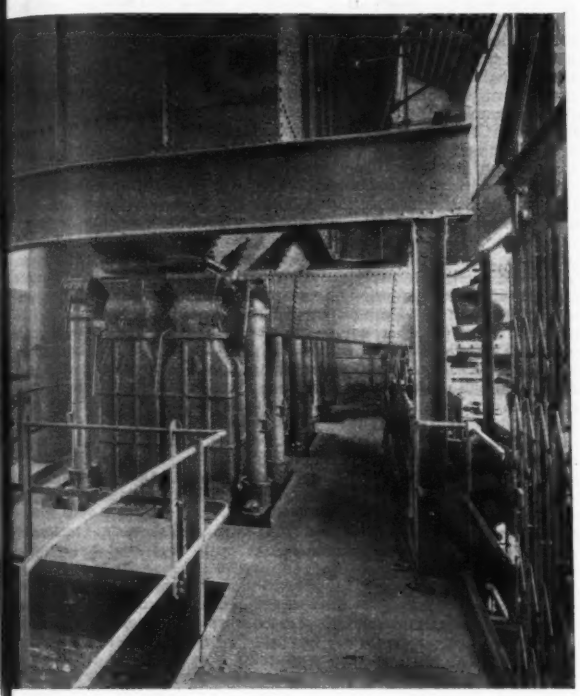


Fig. 2.—Interior of the Glover-West Vertical Retort House, Charging Stage.

compartments, two for large coke and one for breeze, giving a total capacity of 80 tons. The coke is tipped into a small receiving hopper, whence it falls on to suitable bar screens. For the supply of coke to the producers a bottom-opening wagon is hoisted to the producer platform level by means of the lift. The supply of coke to the retorts after scurfing is contained in a small storage hopper of about 20 cwt. capacity, filled by means of side-tipping wagons, which are taken by way of the lift and tipped from the conveyor platform level. The hopper is fitted with a bag-filling shoot, having a measuring chamber with slide door above and below.

The driving mechanism for the coke extractors consists of two horizontal steam engines, each developing 4½ H.P. at 90 r.p.m. The speed reduction is effected by fast and loose pulleys, belts, and spur and double helical reduction gears.

ELECTRICAL SUPPLY.

The retort-house and coal-breaking machinery is actuated by electricity obtained from the Clyde Valley Electric Supply Corporation, Ltd.; the energy available being alternating, three-phase current at 25 periods and 415 volts. The installation is complete with adequate electrical wiring and equipment.

CONDENSERS AND EXHAUSTERS.

The condensers were in use at the old works, where they were erected in 1912. Being in splendid condition, and of ample capacity, they were dismantled, overhauled, and re-erected on the new site. They are of the two-tower, reversible, water-cooled type, manufactured by Messrs. Clapham Bros., capable of dealing with one and a quarter million c.ft. of gas per day. The tubes are so arranged that they can be removed singly, if required. Each tube is fitted with an Eclipse stuffing box and gland joints, thus affording the maximum bore for water flow. The water, after use in the condensing process, is collected in an underground tank, from which it is taken as feed water for the boiler. The exhausters were removed from the old works, where they had been in commission since their erection in 1911-12. They are in duplicate, and of the two-blade type, manufactured by the Bryan Donkin Company. Each exhauster is direct-coupled to a horizontal steam engine, and has a daily capacity of one million c.ft. of gas, at a speed of 80 r.p.m., against a pressure of 20 in. of water. The speed of the engine is automatically controlled by hydraulic regulators, which immediately respond to any change in steam pressure or in the quantity of gas dealt with. The arrangement for compensating is by means of a 6-in. pipe, connected between the inlet and outlet mains, on which is fixed a valve operated by a hand wheel. The lubrication is adjustable and automatic in action.

TAR-EXTRACTING AND WASHING PLANT.

This plant consists of one tar extractor, one Livesey washer, and one washer-scrubber. The tar extractor is of the well-known P. & A. type, designed by Messrs. W. C. Holmes & Co. Its capacity is one million c.ft. per day. This apparatus, with connections, forms part of the plant removed from the old works and re-erected for further service. The Livesey washer, with a similar capacity, was designed by Messrs. Clapham Bros., and serves the purpose of removing the final traces of tar. The virgin liquor from the collecting mains and condensers is put through the Livesey washer, to increase the ammonia content, before being allowed to flow into the tar and liquor well. The washer-scrubber, after ten years' service at the old works, was overhauled and re-erected. It was designed by Messrs. W. C. Holmes & Co., and has a capacity of one-and-a-quarter million c.ft. per day. The machine is made on the "double-unit" system.

PURIFYING PLANT.

The purifiers form part of the newly-acquired plant, and consist of four boxes, each 30 ft. by 25 ft. by 5 ft. deep. Their daily

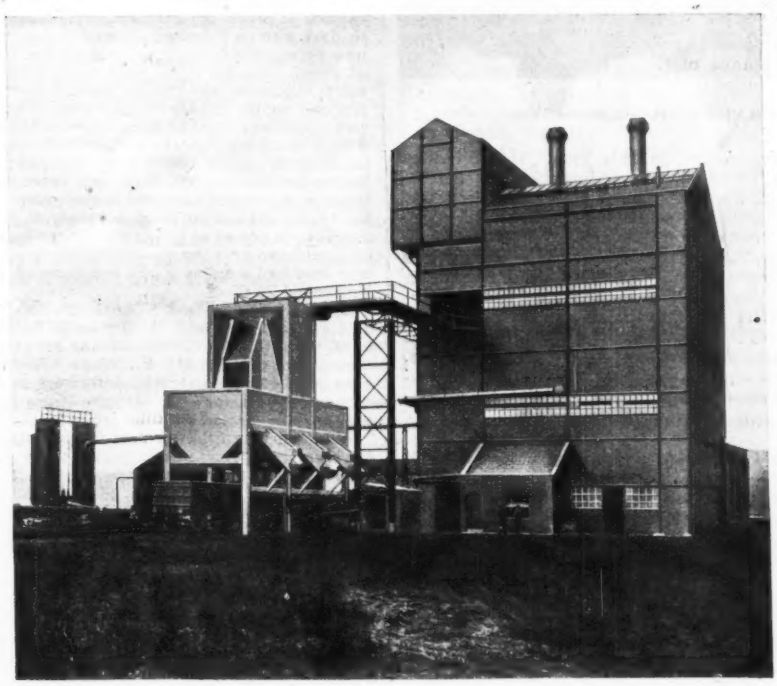


Fig. 3.—General View of Carbonizing Plant, showing Coke Hoppers.

capacity is one-and-half million c.ft. The boxes are equipped with Clapham's patent "Triumph" valves, providing for downward flow; and are so arranged that any one may serve as first in the series, and in any rotation. The compartments are fitted with three tiers of wood grids, and each box has four covers. The covers are made gastight by Eclipse rubber joints, and are fastened down with hinged bolts. The station meter was erected by Messrs. James Milne & Son in 1904. It is of the square type, with a measuring capacity of one million c.ft. per day. The station governor is accommodated in the same building as the meter.

Gasholder and Tank.

The holder is designed on the spiral-guided principle. It has three lifts, and a storage capacity of three-quarters of a million c.ft. Maximum storage throws a pressure of 10 in. of water, while the lowest pressure, from the inner lift, is 5 in. of water. The diameter of the steel tank is 107 ft., and the depth is 32 ft. 6 in. It is erected entirely above ground. The tank is supported on a concrete raft., which is 21 in. thick at the centre, tapering to a thickness of 18 in. round the outer circumference. The contract for the gasholder and tank was entrusted to Messrs. The Barrowfield Ironworks, Limited.

Boilers.

The steam generating plant consists of a Lancashire boiler, supplemented by a Cornish boiler which was in use at the old works. The Lancashire boiler is new plant, and was installed by Messrs. John Thompson (Wolverhampton), Limited. The

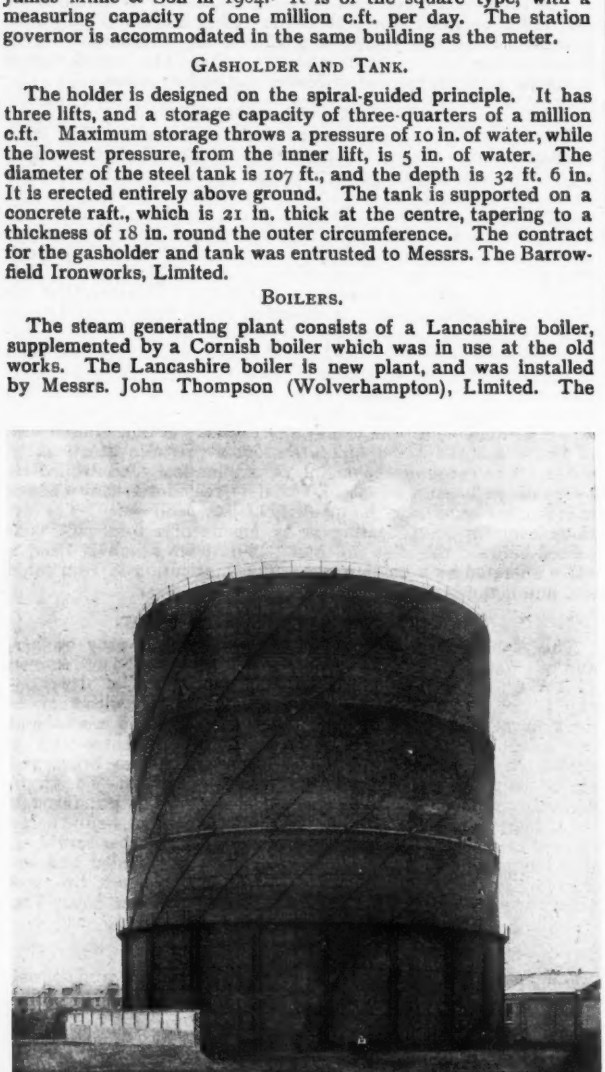


Fig. 4.—General View of Gasholder and Tank.

dimensions are 8 ft. 6 in. diameter by 30 ft. long. It is provided with Goodrich and Hamlyn forced-draught furnaces, designed for coke-breeze fuel, while a Ferguson steam superheater has also been connected. The "Multiflow" feed-water heater and pump were manufactured and installed by Messrs. G. & J. Weir, Ltd. By means of the former, the exhaust steam from engines and pumps is utilized in raising the temperature of the water entering the boiler. The boiler chimney is of riveted steel and has an internal diameter of 4 ft. 11 in., while the height is 90 ft.; it is lined with 4½ in. brickwork. The boiler house has been designed to accommodate two Lancashire boilers of the same dimensions, but the existing Cornish boiler has, in the meantime, been installed as a standby in case of emergency.

Results from a Recent Test.

Mr. Bell writes: "The following results were shown in a recent test:

Make of gas per ton (corrected)	21,059 c.ft.
Calorific value (gross)	446 B.Th.U.
Therms per ton	93·9
Net coke for sale per ton of coal (after deducting fuel to producers)	9·1 cwt.

The yield of tar and ammonia has not yet been taken; but I am arranging to provide facilities for this in future testing.

The figures above quoted are from the most recent test, which was carefully conducted, all the coal and coke being actually weighed. It is not, however, the highest thermal yield we have obtained; the maximum has been 97·8 therms per ton, with a calorific value of 430 B.Th.U. per cubic foot."

Luncheon.

There was a large gathering at luncheon in the Burgh Hall, Provost Garrick presided; and the Croupiers were: Bailie James Roger, Bailie John Gilfellan, Bailie Wm. M'Intosh, Treasurer James D. Young, Dean of Guild James M'Kinney, Master of Works John M'Caarn, and Mr. James Bell. Following the toast of "The King,"

Ex-Provost J. G. Buchanan proposed "The Dumbarton Gas Undertaking," coupled with the name of Provost Garrick. He said they had seen that day what they had reason to believe was absolutely the last word in a gas undertaking. The gas industry now had a world-wide pre-eminence and standing, because they would find few towns of any size and importance that did not possess a gas undertaking. So far as Dumbarton was concerned, the first Gas Company was formed in 1832, and had quite a successful career. In 1873, the Town Council, with their usual foresight, thought there was something good in gas, and made arrangements for purchasing the undertaking. He understood the agreement proceeded along the lines that each of the shareholders in the old Gas Company should receive 9 p.ct., and as each of them died the interest held was bought over by the Town Council. From the moment the Council acquired the gas undertaking, it made substantial headway, and round about 1915 it came to be recognized by those in authority that the old gas-works were becoming too small and somewhat out-of-date. There was also at that time a general recognition of the fact that something newer and better in the way of plant was required. The then Provost was ex-Provost John Buchanan, and he exercised himself greatly over the matter. Good fortune and chance came along simultaneously, and an opportunity presented itself to the Council by which the old gas-works could be disposed of. On this point, he would like to say that no more generous offer was ever made to a Town Council for the acquisition of such a concern as a gas undertaking. To his credit, Provost John Buchanan had the foresight to see what was required, and the courage to clinch the bargain. Indeed, the ratepayers of Dumbarton were under a debt of gratitude to Provost Buchanan and his Committee for the manner in which the work had been carried through at that time.

Provost Garrick, in reply, remarked that to ex Provost Buchanan especially belonged the credit of the new works, while they were also under deep obligation to ex Provost John G. Buchanan for carrying on the enterprise so begun. The late Mr. R. G. Mackenzie once said he remembered as a boy, in 1820, that a single shop in Dumbarton was lit by gas. It was not, however, until 1831 that any attempt whatever was made to produce gas for the general use of the public. As a matter of fact, on Oct. 20 of that year a meeting of prominent citizens was called, and it was then decided that a company should be formed. A committee of those present were appointed, and set about this work in no half-hearted manner. It was a commonplace with those associated with the gas undertakings in Scotland that Paisley had a great reputation for gas engineering, and so it came about that the Committee called in the services of Mr. Cook, of Paisley, then regarded as one of the leading experts in Scotland. Mr. Cook designed a gas-works suitable for the town, at an estimated cost of £788. On May 7, 1832, the Company was formed, with fifty shareholders, and a capital of £1000; and on Oct. 7 they were in a position to supply gas. During the war there was such a clamant demand for gas for industrial purposes, that it became evident that something had to be done. The Gas Committee recognized that the resources of the existing plant had been fully reached; and ex-Provost Buchanan saw his way clear to recommend to the Council a complete scrapping of the old plant, and the establishment of entirely new works. For the very fine works that had been laid down, the Council and the community were indebted to their energetic and capable Manager, Mr. James Bell. Mr. Bell's ideas were so thorough and modern that no suggestion by way of improvement was thrown out in regard to his original design. The Committee were advised by Mr. Bell and others that the system capable of producing gas most economically for the situation they had to deal with in Dumbarton, was that of vertical retorts. They had now a plant which would produce 750,000 c.ft. of gas a day. In a time of stress, the plant might yield nearly 1,000,000 c.ft., as against an absolute maximum with the old plant of round about 500,000 c.ft. daily. Not only so, but the lay-out had been so arranged that, at a minimum cost, extensions could be made when necessary. He felt the utmost confidence in stating that the works which that day had been successfully inaugurated would amply serve the gas-consuming public of Dumbarton for the next thirty or forty years, and that, too, without very much in the way of additions to the plant. They had made provision for having always on hand a supply of gas capable of meeting demands for a period of 36 hours. There had been a certain amount of local criticism over the new undertaking; but he was convinced that now they had a works which would stand all the criticism that could be levelled at them.

Bailie Ward proposed "The Contractors," coupled with the names of Alderman West and Mr. Porteous Laidlaw. He explained that, in his view, the Gas Committee had been both happy and judicious in their choice of contractors. While West's Gas Improvement Company had been the principal contractors, and had done their work exceptionally well, the same measure of praise applied to all the others who were connected with the job.

Alderman Fred. J. West, in the course of his reply, congratulated the inhabitants upon the possession of an excellent gas-works, which would certainly turn out to be one of the most valuable municipal assets they had in the burgh. He had also heartily to congratulate those who made the bargain for the disposal of the old gas undertaking. The new works had cost in all something like £130,000; but against this they had to place a sum of £60,000 received for the old site. Nowhere in the country could they find such a well-equipped undertaking as they had in Dumbarton, where the actual capital expenditure reached the modest figure of £70,000. To his mind, the Engineer at Dumbarton was in possession of an undertaking which was a tribute to his skill and experience in gas engineering. Alderman West concluded by presenting Provost Garrick, on behalf of the contractors, with a silver salver as a souvenir of the occasion.

Mr. Porteous Laidlaw then presented Mrs. Garrick with a silver tray, and Bailie Ward with a silver tea service.

Suitable acknowledgments were made by Provost GARRICK and Bailie WARD.

Major M BRIDE proposed "The Gas Industry," coupling with the sentiment the names of Mr. George Keillor and Captain Kennard.

Mr. GEORGE KEILLOR, of Greenock, in acknowledging the toast, said the gas industry was one of the oldest established businesses in the United Kingdom; and collectively it was also one of the largest. They were proud of the industry because of its lineage and the brilliant part it had played in the rapid advance of civilization and progress during the past century; because of its scientific achievements in the economics of gas production, distribution, and engineering; because of the splendid work of its Technical Institutions and Commercial Associations; because it was tolerant with electrical propagandists and their terminological inexactitudes; and because of its high ideal, which was, "All for the public good." [Applause] For these reasons it was a pleasure to reply to the toast, but it was an added pleasure when the work of their friend, Mr. Bell, Dumbarton's able and energetic Gas Engineer, was the lodestone of the gas industry's attraction at this particular moment. It would take too long to tell the story of the gas industry's wonderful progress. It must suffice to say that it had 8½ million customers on the books, and that to supply with gas the annual wants of this multitude 21 million tons of coal had to be scientifically handled. The industry would not come to a standstill, despite the prognostications of the pessimists. They were not to be mesmerized by the brilliance of the growth of the electrical industry. Their own growth was also brilliant. They were still first in the supply of light, heat, and power; and, owing to the virility and the efficiency of gas production as compared with electricity, their superior position would be maintained against all comers. If proof was required that they were not a decadent industry, it was to be found in the fact that during the past ten years the consumption of gas had increased by no less than 60,000 million c.ft., and that in Canada and America the increase had been even more noteworthy. Only the other month Mr. Bell, their Engineer, in a valuable paper presented to the North British Association of Gas Managers, was telling them how their position could still further be strengthened; and if his schemes on the service side of the industry came to fruition, the visitors would soon be back again to honour them with their company at the inauguration of new showrooms. The new gas-works they had been privileged to inspect that day were a monument to the enthusiasm and engineering skill of Mr. Bell, and to the public representatives who so wisely aided and supported him. Mr. Bell spent many a weary hour plotting and planning these fine new works; but, as one who loved his profession, he did so quite ungrudgingly in the best interests of the people of Dumbarton. He must be proud to know that he had accomplished a work which raised him in professional status, and also in the esteem of his employers. He (Mr. Keillor) would like to refer to the local patriotism and the splendid spirit of generosity which prompted Messrs. M'Millan and Sons to give such a munificent sum—£60,000—for the site of the old gas-works. This gift—he used the word advisedly, because it was much more than the actual value of the ground—would save the gas consumers in Dumbarton at least £4000 per annum. It was, therefore, easy to calculate that, in the near future, low capital charges on the undertaking, combined with Mr. Bell's acknowledged skill in the economics of gas production, would enable the Town Council of Dumbarton to sell the best and cheapest gas in Scotland. [Applause.]

Captain KENNARD, of Falkirk, also briefly acknowledged the toast.

"Our Guests" was proposed by Bailie RODGER, and replied to by Mr. M. E. DENNY.

Gas Session at the Public Works, &c., Congress.—The programme now issued of the Public Works, Roads, and Transport Congress and Exhibition (1923), to be held at the Royal Agricultural Hall, London, from Nov. 22 to 29, states that the conference arranged by the Institution of Gas Engineers will open at 11 o'clock on Wednesday, Nov. 28, in the Shepherd's Room. The chair will be occupied by Mr. Samuel Tagg, of Preston, the President of the Institution, and, as already announced, papers will be read on "The Quality and Composition of Town's Gas," by Mr. H. E. Bloor, B.Sc., B.Eng., of York, and on "The Position of Mains in Public Highways," by Mr. Stephen Lacey, B.Sc., Assoc.M.Inst. C.E., Distributing Engineer to the Gas Light and Coke Company. There are to be other conferences on the different days; and the exhibition itself will be full of interest. The President is the Rt. Hon. Neville Chamberlain, M.P., Chancellor of the Exchequer; and the Chairman of the Organizing Committee, Sir Henry P. Maybury, K.C.M.G., C.B. (Director General of Roads).

Canadian Gas Inspection Service.—The report for the year to March last of Mr. O. Higman, Director of Electricity and Gas Inspection Services of the Canadian Department of Trade and Commerce, gives the customary particulars of the coal gas and water gas companies registered, and the tests undertaken of gas and of meters. The number of meters in use by each undertaking is furnished. There are also lists of natural gas companies and acetylene gas companies registered, with the numbers of meters in service. On the subject of gas-meter ratings, Mr. Higman says: A considerable amount of investigation has been carried out during the year in connection with the matter of the standardizing of the capacity ratings of gas-meters; these being now uniformly based on the number of cubic feet of gas that a meter will pass when a pressure equal to 2 in. of water is applied at the inlet of the meter and the gas passes the outlet at a pressure equal to 1½ in. of water. The rated capacities of meters thus have now an absolutely definite meaning, in contra-distinction to the old method of rating by lights. Under the old method, which was entirely arbitrary, the number of cubic feet of gas per light was an irregularly decreasing number as the size of the meter increased, and the five-light meters of different makes varied largely in the amount of gas they would pass.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

Opening Meeting of the New Session.

The opening meeting of the new session of the Association took place on the evening of Oct. 26, at the Westminster Technical Institute, S.W., when there was an excellent turn-out of members to hear the Presidential Address of Mr. Walter Grogono.

COUNCIL'S PRESENTATION TO MR. WINSLOW.

Mr. D. CLEAVE CROSS (Lea Bridge), the outgoing President, who occupied the chair at the opening, said he hoped this would be the start of a very profitable session. Before passing to the address, he had an exceptionally pleasing duty to perform. On his retirement from the office, Mr. George Winslow was to receive an illuminated address from the Association as some recognition of the splendid work he had done as Hon. Secretary during the past eight years. He had given magnificent service; and the Council felt they were not satisfied that only an address should be given, but wished themselves to offer him some small mark of their appreciation. The members of the old Council had therefore subscribed for a clock—this having been chosen rather than a personal present, because Mrs. Winslow had all along rendered valuable help to her husband in his secretarial work. They all wished Mr. Winslow long life and much happiness. [Applause.]

Mr. WINSLOW, in his acknowledgment of the gift, said he had always been treated with the utmost loyalty on all hands.

THE NEW PRESIDENT.

Mr. CROSS, introducing the new President, remarked that Mr. Grogono was an extremely enthusiastic man, and enthusiasm was absolutely essential for such an Association as theirs.

Mr. WALTER GROGONO (Gas Light and Coke Company, Fulham), who was warmly greeted, took the chair, and expressed his pleasure at the receipt from friends at Beckton of a telegram of congratulation. He then proceeded to deliver the following

PRESIDENTIAL ADDRESS

In presenting my address to you this evening, I propose to give an outline description of the Fulham Station of the Gas Light and Coke Company. These are the works at which I am at present stationed; and owing to the kindness of the Governor and Directors, they will be open for any member of this Association to visit on Saturday, Feb. 9, 1924.

They stand on a site on the north bank of the Thames, a short distance above Chelsea railway bridge. The area of the works is 27 acres; and the Company own the adjacent land, upon which are the motor-repair shop, Harwood Terrace stove depot, and houses for employees. The capacity of the works at present is about 11 million c.ft. of gas per day.

COAL HANDLING.

The whole of the coal carbonized is brought up in barges, which upon arrival are berthed in the dock. The coal is unloaded by two Smith steam cranes on the south side of the dock, and a steam hoist on the north side. These feed a complete crushing and conveying system, which has now been in action for about eighteen months. A 24-in. rubber belt, which carries the coal to the central crushing pit, is fed by chutes from the discharge hoppers of the cranes. A further belt of the same capacity brings coal across the dock from the discharge hoppers of the hoist. The central crushing pit is composed of four 18-in. Jeffrey crushers. The crushed coal is conveyed by two belts. One travels over the dock, and feeds the retort-houses situated on the north side; the other discharges on to a cross belt, which delivers the coal to a shuttle conveyor inside No. 5 retort-house, on the south side of the dock. This shuttle conveyor is, as its name implies, a conveyor which travels backwards and forwards over the retort-house bunkers, thus securing an end discharge. At the same time, it is only half the length of the house. All these rubber-belt conveyors run at 250 ft. per minute; the 24-in. belts carrying 100 tons, and the 18-in. ones 60 tons per hour. For storing coal in the yard there is a push-plate conveyor of old design, which is fed by chutes from the crane bunkers erected in 1892 by the Chain Belt Engineering Company, Derby.

RETORT-HOUSES.

There are four retort-houses, numbered 1, 3, 4 and 5. No. 1 house has been pulled out, and is about to be reconstructed. No. 3 house contains twenty beds of ten retorts five tiers high; the retorts being 23 in. by 16 in. by 20 ft. long. The furnaces are on the regenerative principle; the waste gases passing through the main flues to two chimney stacks, one at each end of the house. The retorts are operated by one Fiddes-Aldridge machine; the coke being pushed out on to a drag-bar type of conveyor, where it is quenched, and carried to a coke storage hopper. Liquor is circulated at a high temperature through the hydraulic mains, and the tar is taken-off by eight tar towers, or one tower, to five hydraulic mains. The vacuum on the retorts is maintained by four Parkinson governors. All the plant in this house is electrically driven. No. 4 house contains eighteen beds of eight inclined retorts, and is not at present in use. No. 5 house was the last to be reconstructed, and was put to work early in 1922. It contains twenty sets of ten retorts, each 23 in. by 16 in. by 22 ft. long. The furnaces are of a similar pattern to those in

No. 3 house. The 200 retorts are charged and discharged by one Fiddes-Aldridge machine; the coke being pushed from the retorts on to the first of a series of conveyors, by which it is carried to the coke-storage hoppers. The latter are of reinforced concrete, and have an overflow extension fitted with a separate conveyor. The retort-houses are worked by two eight-hour shifts, with a break of four hours between each; the charge being of 12 hours' duration.

EXHAUSTER ROOM.

The gas from all the retort-houses passes directly to the exhauster room, where it is handled by six exhausters, all of which were built many years ago by Messrs. Gwynne & Co., and are of the two-blade type. In this building are two further sets of exhausters reserved for pumping gas from other stations, or into the Beckton mains, or from one holder to another. There is also a compressor for supplying gas to the district at a pressure of 5 lbs. per sq. in. This compressor is driven by a 90 H.P. variable-speed electric motor.

CONDENSERS.

The coal gas passes from the exhauster house to the horizontal atmospheric condensers. There are two sets; the first being 78 ft. in length, and the second 84 ft. Each set is built up of six tiers of 12-in. cast-iron pipes in six parallel rows. These are kept clean by the process of steaming one pipe per diem. The inlet and outlet connections are 30 in. in diameter, arranged so that the gas enters at the bottom and leaves at the top. Following these are two sets of "Clapham" water-tube condensers, which are used only when the temperature of the air is high. These are supplied with water circulated from a gasholder tank.

WASHERS.

The gas is then divided into three streams; each passing a Livesey washer followed by a washer scrubber. From these the gas is carried by three mains to the other side of the works, where it passes through two sections of scrubbers. Each section is composed of three towers; the first and second being a liquor, and the third a water, scrubber. The liquor from the third scrubber is pumped to the washer scrubbers, where it is worked-up to the strength required. As all the liquor from this works is carried by barge to our products works at Beckton, it is of considerable importance that the strength should be worked-up as high as possible, in order to keep down the excessive cost of lighterage.

PURIFIERS.

There are five sections of purifiers; three being allocated to coal gas, and two to oil gas.

The coal-gas sections are worked in backward rotation, and there are no check purifiers. All the vessels are charged with 3 ft. of material—one bed of 2 ft., and one of 1 ft. After leaving the purifiers, the gas is washed with gas oil, for the removal of naphthalene (this oil, when saturated, is returned to the oil-gas plant, and used in the ordinary way), passes through the station meters, and goes forward to the holders, mixing with the oil gas at the inlets.

OIL GAS.

The present oil-gas plant was built in 1909, and extended in 1919. The first installation consists of two Humphreys and Glasgow twin generator sets with a total output of 2½ millions per day. The second installation consists of a single generator blue-gas set, with a waste-heat boiler attached, of a capacity of 1½ millions per day. This plant has its own boiler house and engine room. At the present time, a waste-heat boiler is being installed between the two oil-gas sets. This will be arranged to utilize the heat from the waste gases of either set.

ELECTRICITY GENERATING ROOM.

The whole of the electric current used on the works is supplied from this engine room, and is generated by four units at 220 volts. The first three sets are each of 37½ KW. capacity, and are driven at 210 r.p.m. by single-cylinder National gas-engines of 80 H.P. No. 4 unit is of a larger size, being composed of a four-cylinder vertical gas-engine built by Browett Lindley, and direct-coupled to a 150 KW. dynamo running at 375 r.p.m. We are at present engaged in installing a further set—a duplicate of the 150 KW. set.

The cooling of the four-cylinder engine is carried out by a Heenan and Froude evaporative cooler, and that of Nos. 1, 2, and 3 units by circulating the water through batteries of tanks. Nos. 1, 2, and 3 engines have hand-compressor starters; and the larger vertical engine is started by compressed air at 250 lbs. per sq. in., which is provided by a small gas-engine and compressor, and stored in cylinders placed permanently in the engine room. The main switchboard for the works is also situated in the same building. The whole installation has been carried out by the Lancashire Dynamo Company.

CONTROL.

The control of the quality of the gas coming from the retort-house is carried out from a valve room, in which there are always two men on duty. The quality of the gas at the outlet of the exhausters is registered by a jet, and also by a Sigma recorder on each stream. The readings of these instruments are telephoned every quarter of an hour to the men on duty in the valve room; and the vacuum in the retort-house is regulated from the knowledge thus obtained of the quality of the crude gas at this early stage. The calorific value of the purified coal gas is registered in the valve room by a recording calorimeter; and it is found that the time lag between the exhauster room and valve room is between half an hour and one hour, according to the amount of coal gas being made. Also, the valve men have the power of increasing or decreasing the quantity of oil carbonized in the oil-gas plant. By these two means they are able to maintain a steady quality of gas going into the holders. The gas supplied to the district is controlled also from the same room; and a record of its quality is kept by a Fairweather calorimeter.

Owing to our method of coal handling, we are able to arrive at the amount of coal carbonized each day. This enables the make of therms per ton of coal carbonized to be worked out daily, and booked up in our "daily-carbonizing" book. The make per ton of residuals is obtained weekly. A set of charts is kept daily, showing the total coal carbonized in each retort-house and the charge per retort. The "therms per ton," and the "charge per retort" are plotted weekly; and the charts are hung up in the retort-houses. A daily chart of the temperature of the combustion chamber of each set, on both sides, is kept in each retort-house. To keep in touch with the expenditure of the wear and tear side of the works is not so easy. The Engineer of the station, however, has put into use a ledger, into which is entered weekly an analysis of the wages sheets, under standard headings; any special work done being entered as occasion arises. At any time, the expenditure on labour up to date on any job can be obtained from this book. In my experience, this figure is usually the hardest to obtain. The material used on any job can be extracted from the stores' book; and, of course, any contract connected with the work is a known amount. By this method, control can be kept of the expenditure on any plant or part of the works.

The works is well fitted with recording gauges; boilers having a Lea recorder fixed on the feed water, and a CO_2 recorder on the waste-gas flue. All the fuel taken to the boilers is measured, and tested for ash and moisture; a record also being kept of the steam pressure, and the temperature of the feed water. In fact, the boilers are being worked under test continuously. Also, there is kept a chart showing the monthly consumption of lubricating oil and greases, worked out per million c.ft. of gas made. A close watch is kept on the gas consumption on the works; each plant having its own meter. Also, the electric generators have meters fitted to each dynamo panel.

BOILERS.

There are six Thompson dish-end 30 ft. by 8 ft. 3 in. boilers in the main boiler-house. All are fitted with Goodrich & Hamlyn forced-draught furnaces, to burn breeze. These furnaces in this size of boiler give a grate area of 42 sq. ft. Feed water for the whole battery of boilers is raised to a temperature of about 110° Fahr. by passing it through the oil-gas water-tube condensers, before it enters the hot well. The boiler feed pumps, four in number, all made by Lee Howl, are so arranged that they are below the level of the water in the hot well. In consequence of this, they have flooded suctions, thus preventing any trouble from pumping of hot water. The three oil-gas boilers are of the Lancashire type, each 28 ft. by 7 ft., with Wilton furnaces, which are now fitted with Stephen Holden burners for using oil-gas tar. With this type of burner it is possible to burn the fuel without any smoke. The feed water for these boilers is taken from the hydraulic system, and is heated under pressure (by an exhaust-steam heater) before entering the boilers.

WATER SUPPLY.

The water for the works is obtained from a 500 ft. deep well. It is raised by means of an air lift to ground-level, and then pumped by a turbine pump to the storage tanks. The plant is capable of dealing with between 7000 to 8000 gallons per hour. This water is used for all purposes where clean water is required, and is suitable for the boilers without treatment. The waste-heat boiler on the oil-gas plant is fed with this water; and up to the present very little trouble has been experienced. The water for quenching coke, &c., is obtained from the dock and pumped to an overhead tank.

LOBBIES.

The lobbies provided for the foremen and men are worthy of mention. In every case two lobbies have been provided—one for meals and another for washing and changing; the floors and walls being tiled. All the lockers are made of steel, and have slanting tops, so that it is impossible for rubbish to be placed thereon. The basins, which are of ample capacity, are supplied with hot and cold water, through one tap to each basin. By this method twelve basins can be supplied with hot and cold water by thirteen taps.

TRANSPORT.

There are two full-gauge locomotives, and a considerable amount of track, but the works are really laid out for horse-and-cart transport; the locomotives only being used for bringing in permanent-way trucks from the siding, and not for handling the material on the works. For this purpose, there are twelve horses, all of which are stabled at the works.

In the few words I have just read, I have purposely refrained from giving details of each plant, hoping that I have said just enough to make you all wish to come and see the works and obtain further information on the site. I cannot close these remarks without touching on a subject which is very close to the hearts of the members of the Junior Associations—namely, the education question. I think the scheme as arranged by the Institution of

Gas Engineers, and so very ably explained to us by Mr. Walter Hole, the Organizing Secretary, is in every way good. In my opinion, there should not be any question as to the examination for which the gas students will present themselves in the future; and I sincerely hope that the future qualification for becoming a member of any Junior Association will be the possession of Institution Certificates.

Mr. W. NEWTON BOOTH (Woolwich Arsenal) proposed a hearty vote of thanks to the President for his address, which, he said, was almost an ideal one for an Association of Juniors, who were necessarily concerned mainly with details, rather than with questions of general policy.

Mr. W. L. WESTBROOK (North Middlesex Gas Company) seconded, and agreed that it was just the kind of address they needed.

Mr. CROSS supported the vote, which was suitably acknowledged by the PRESIDENT.

NEW MEMBERS.

A gratifying feature of the opening meeting was the reading by Mr. LEONARD LACEY (the Hon. Secretary) of the names of twelve new members of the Association.

FURTHER PRESENTATIONS.

The PRESIDENT said Mr. Cross had handed over his office with an Association membership of 276, and a balance of £149, subject to payment for the "Transactions." This, he believed, was the largest balance the Association had ever had; and because of it they had been able to reduce the subscription to 10s. a year. On behalf of the members, he had the greatest pleasure in handing Mr. Cross a framed illuminated address, wishing him all the joys that could be wished.

Mr. CROSS, returning thanks, pointed out that it was a very pleasant thing to be President of such an Association, and urged each member to strive his hardest ultimately to reach an executive position.

The PRESIDENT next presented an illuminated address suitably framed to Mr. George Winslow, and said that they were very sorry to lose his services as Secretary, though it was gratifying to know that they would still have the benefit of his experience as a member of the Council. They wished him all possible success in everything he might undertake.

Mr. WINSLOW said he would always feel exceedingly proud of the gift. He had a profound admiration for the Association, and it had been very hard to give up the Secretaryship. Indeed, he would not have given it up at all, had it not been for the fact that his friend Mr. Lacey (who would prove himself an able successor) agreed to take on the work.

Before separating, light refreshments were served, and members spent a pleasant hour in social intercourse.

CHEAPER GAS AND GREATER CONSUMPTION.

An Address to the Yorkshire Junior Gas Association.

By Mr. W. B. M'LUSKY, of Halifax.

At the 21st Annual General Meeting of the Association, held at Leeds University on Oct. 20, under the presidency of Mr. W. HEATHCOTE (Halifax)—in succession to Mr. H. L. Bateman (Wakefield)—an address on the means of producing and selling cheaper gas, and thereby increasing the consumption, and consequently enhancing the gas service and the ultimate gas-department income, was given by Mr. W. B. M'Lusky, Engineer and General Manager to the Halifax Corporation Gas Department.

Mr. M'Lusky, in response to complimentary introductory remarks by the President, said he considered it a distinct honour to be permitted to address the Association. He was never happier than among the Juniors; and he thought it was a joyful thing for those who had passed through the early troubles in their career to get down and give a little help and encouragement to others who were still struggling with them. Furthermore, he never did really regard the Yorkshire Junior Association as juvenile people at all. Their membership included men very young in the profession, but also a large number of men who were certainly seniors in one department or another of the industry. Some were experts in gas manufacture, or specialists in engineering or chemical research. Some were engaged on clerical, commercial, or administrative sides of the industry. Some might be juniors only inasmuch as they were less advanced in age. Others might appear to be more advanced in age, yet were probably junior in outlook, because they had not ceased to think new thoughts and do new things. A Junior Association of gas engineers was indeed of very complex composition. It was wide enough to harness the forces of nature, young enough to give an ideal form or value to things, and imaginative in the highest and best sense of the term, having the power to scheme, devise, contrive, and compass. He was not addressing the meeting from the exalted altitude of one on a platform, but down on the floor of the house. His purpose was to excite their imagination on one or two important topics, and he wanted to hear their views. Those present had been trained each in his own special direction; but he proposed to talk to them about something which concerned them all, and the industry as a whole—the subject of profit.

He remembered, some twenty-five years ago, being caught by a friend while he was hunting behind a condenser for a halfpenny. His friend asked him what he was searching for. He replied, "I'm looking for a halfpenny." "What!" exclaimed the friend, "Going to all that trouble for a halfpenny?" "Yes; a halfpenny per 1000 c.ft.," Mr. M'Lusky answered. [Laughter]. He had found that halfpenny. If he had not done so, he doubted whether to-day he would have been Engineer to the Halifax Gas Department. It was an old proverb that there was no profit made except from earnings; and profits appeared when the expenditure was less than the revenue. This sounded commonplace, but they might as well have a proper understanding right at the start. Having got so far, he would venture the opinion that, notwithstanding all that had been said to the contrary, profits were still related to good retort-house practice. If his hearers did not believe him, all they need do was to study periodical analyses of accounts in the Technical Press. There they would find that good management and good engineering were first cousins to profits.

SELLING THE GOODS.

But they had to sell the goods they produced. A big turnover relative to capital employed made it easy to sell gas at a low price. When they took into consideration the quality and the price to be charged, did they consult the consumer? Did they say to him: "How will you have it? Will you have 250 c.ft. to the therm or the plain 200? It is all the same price." Did they, after considering many other things, including the needs of the consumer, finally resolve that, as the cost of coal *less* residuals constituted a comparatively small proportion of the total cost of manufacture and distribution, it would be better, on the whole, to supply the smaller volume for the money, and thereby collect more money for every 1000 c.ft. of gas supplied? This was rather an oblique statement, but he had purposely made it so. In Yorkshire gas undertakings the cost of producing a therm had now receded almost to pre-war levels. In Halifax, for example, the cost of coal per therm for the twelve months ended March 31 last was less than 1d.—for net coal.

The question arose: Why strive to distribute gas of only 400 B.Th.U. value? Why bother about so low a calorific value as that? Why incur all the evil consequences which the suppliers of 500 B.Th.U. calorific value professed to escape, for the sake of a very small and problematical saving—a saving which might not amount to more than a halfpennyworth of coal on every 1000 c.ft. of gas supplied? Why not express a preference for the higher quality, and spend the halfpenny in getting it into the mains, thereby simplifying the work of distribution and collecting from the consumer any sum varying from 6d. per 1000 c.ft. upwards, according to the price charged per therm? Sixpence for one halfpenny was a good business proposition, if one only thought of it in terms of money. Was there any merit in increasing the total charge for every 1000 c.ft. of gas supplied to the extent indicated, because a relatively small proportion of the cost of production had been slightly increased? This was an important question. They were on the threshold of the greatest development in the sale of gas that the industry had ever known, and if they could satisfy the demand for gaseous fuel at an economic price for all purposes, fresh uses for gas would multiply year by year.

It was true that recent improvements in appliances were equivalent in their economical effect to substantial reductions in the price of gas; and the prices charged for gas had also been reduced, despite the continued high price of coal and other materials. In many cases there were signs of a revival in trade as the result of substantial reductions in the price of gas. In no other industry had the attempt to reduce costs and charges succeeded so well as in the gas industry. It would be an advantage to the trade of the country if the public spirit shown by gas undertakings in this respect was emulated by suppliers of coal and other essential materials. If the restrictions as to payment of dividends in the gas industry were fair, why not extend similar "facilities" to those responsible for the supply of other essential materials and services? So long as high prices ruled, the very improvements in plant, machinery, and processes necessary to further reductions in the cost of production would be delayed. Many gas undertakings were suffering already from over-capitalization—the greatest possible hindrance to progress. When the price of gas was loaded with excessive charges for things other than gas—interest, sinking fund, rates, rent and taxes, &c.—it was impossible to retail the commodity at a competitive price.

INTEREST AND SINKING FUND CHARGES *v.* DIVIDEND.

It was a striking commentary on municipal administration that in the Yorkshire area the amount the consumer was forced to pay towards interest and sinking fund charges exceeded that required to pay the statutory dividends in the case of gas companies. In one or two isolated cases further tolls, by way of contributions towards the relief of rates, were imposed. So great, indeed, was the combined effect of ordinary rates and contributions towards relief of rates in some cases, that if the gas undertaking stopped payment the loss to the community could only be

made good by a tax amounting to 5s. per head of the population —a sum which was roundly equal to the total cost of the administration of public health in 53 of the great towns of England, an administration which cost actually 5s. 7d. per head. It might be said, in parenthesis, that the comparison between gas and public health was permissible, in view of the fact that the extended use of gas would tend towards the abolition of smoke, promote healthier surroundings, and reduce the cost of public health administration. Free trade in gas would not only be good for the gas consumer, but would be a tremendous advantage to the community. This, however, was a matter for the authorities.

The problems of the gas industry itself must be tackled with the optimism that "parts the clouds and sorts out the tangles," and —what was better than all—that costs nothing. Several Yorkshire municipal gas undertakings had repaid the last sovereign of their borrowed capital, and could now look the whole world—and especially their own consumers—in the face. They were to be congratulated. Until the same happy position was reached in other towns, they must be content with the reduction in the incidence of fixed charges that followed an increase in the sale of gas. In his own experience, the sale of gas had been increased by the offer of more attractive facilities for its use, and by concessions in price for all gas used in excess of the volume necessary to provide the required proportion of fixed charges per consumer. If every consumer could be induced to use, to his own advantage, one halfpennyworth more gas per day, the revenue of the gas undertakings in every town would be increased by an amount which would probably be equal to 4s. per annum per head of the population supplied.

In the business of gas supply, as in any other enterprise, one must always bear in mind that it was the little things that counted most. Sometimes the materialization of a little idea was sufficient. The great advantage of giving the consumer a concession beyond his standard was that the undertaking secured an increased consumption without any increase in capital. Revenue collected in the way indicated went into the business. No new mains or service pipes were required. The meters were fixed. The customers were waiting. It would be interesting to note here that the total revenue of the modern progressive electricity supply undertaking selling current at prices ranging from ¾d. to 7d. per unit on different scales for various purposes, averaged about 30s. per head of the population supplied. In some exceptional cases, the volume of business done was greater, but 30s. might be accepted as a representative figure. If the gas industry, with its large number of users, could think on the halfpenny basis for eight years, and only add 4s. per head of the population per annum to the revenue of gas undertakings, the increased revenue of the gas industry eight years hence would be equal to the total revenue of the electricity industry of Great Britain to-day.

Fixing the Price of Gas.

In fixing the price of gas in competition with other fuel, it should be remembered that the consumer had one or more alternatives. He was as free as the buyer or seller of coal, coke, tar, or ammonia. He transacted business at the market price. If the price was not suitable, he would buy a substitute. In fixing the price of gas the interests of every class of consumer should be considered. A flat rate might be charged; but the charges for interest, sinking fund, administration, and distribution of gas should not be levied equally on every 1000 c.ft. of gas consumed. One might argue that everybody should pay alike. This, however, would be most unfair to the small consumer. Interest, sinking fund, &c., amounted in the case of some undertakings to 50s. per consumer per annum, equal to 5s. per 1000 c.ft. in the case of a consumer who used 10,000 c.ft. of gas a year; and this meant a price which they could not get from the small consumer in competition with other fuels. The large consumers, who had many benefits, must carry part of the burden for the small ones, who could not pay their full share. The large consumer must shoulder a bit more than his proper share, in order to enable the undertaking to carry a large number of small consumers.

To distribute these charges equitably, one should find the true incidence of all charges other than works cost. He illustrated this point by means of a chart which he had prepared, showing the works cost and the incidence of the cost of other services and charges per 1000 c.ft. of gas consumed per installation, or on the average basis of the cost of the installation, the service pipe, and the meter. The sum spent on mains, service pipes, meters, stoves, &c., relative to the maximum demand, represented so much capital. The charge imposed on the consumer for the use of that capital and for work and service in connection with gas supply, represented rent.

Discussion.

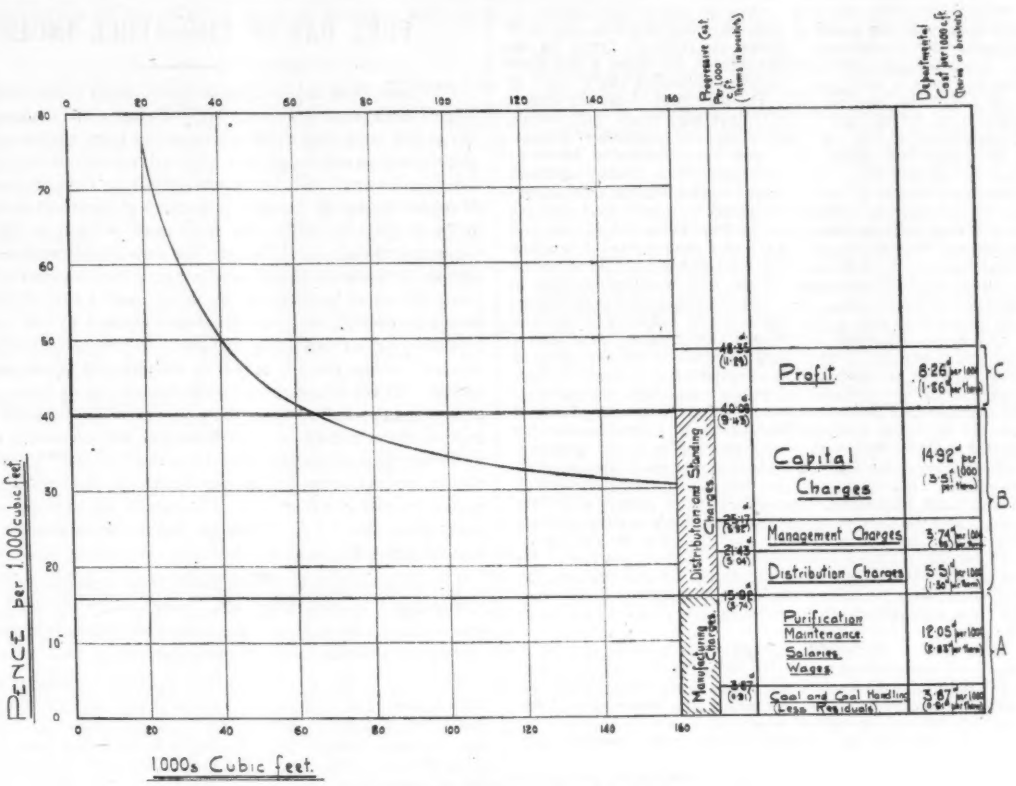
The PRESIDENT said that Mr. M'Lusky had certainly given them all something to think about. Strangely enough, he had touched on a line of thought which he (Mr. Heathcote) was preparing to take in his Presidential Address to the Association in January; but he could assure the members that, though they were both in the Halifax Gas Department, there had been no collusion on this matter. The question Mr. M'Lusky raised as to what gas the industry should give the consumer should, he imagined, raise some discussion; and then, of course, there would arise the question of the effect the gas was going to have on the distribution apparatus. Again, he had raised a most interesting problem as to whether an undertaking should be out for an immediate big profit, or a smaller profit, good service, and greater sale. Another point which would probably have struck many present was the old question as to how it was that gas undertakings were limited by law with respect to the maximum prices they could charge for their commodity, whereas industries supplying the raw materials for that commodity were subject to no such handicap. The answer of anybody outside the gas industry would be that the gas industry was handicapped in this way because the undertakings had a monopoly in their areas. As a matter of fact, they had to face the keenest of competition, in addition to which, while limited in their own selling prices, they were ringed round by suppliers of raw materials who were so combined as to be in a position to cut-out competition in prices of supply of such materials. Another very serious handicap in the case of some undertakings was that of being required to contribute from their profits to the relief of rates. He had spoken on this subject to people who were not in the gas industry; and their reply was that the ratepayers guaranteed the capital outlay, and therefore had a right to the relief of the rates when profits were made. But in practice it simply meant that the gas consumers were paying to relief of their own rates and to the relief of rates of people who did not use the commodity and contributed nothing whatever to interest and standing charges. He hardly regarded it as a fair position. In connection with the matter of a flat-rate charge for gas, he did not think this fair, unless the people all came to the works, purchased their gas there, and carried it away —which, of course, was impossible. Every consumer should pay for the services. If they made a demand for a supply, it was only right they should pay equally for the service they received. It was very difficult to base a proportion of charge for service. If it was a small house, the consumer should have, he felt, at least a minimum demand per annum to secure the service, or should pay something definite for it.

Mr. C. ROPER (Bradford) was in favour of a higher grade gas, even if more had to be charged for it. Apart from their own distribution troubles, which they could get over in course of time, there was the question of getting the full volume to the consumer's end. This was not assured merely when the service pipe was right. The experience of most distribution men was that consumers' fittings, in a large proportion of cases, were even yet almost hopeless so far as getting the best out of the gas was concerned. Gas undertakings, as a rule, had no authority over consumers' fittings. Certainly they did not want such authority—they got blamed for quite enough already. But they had no power to inspect fittings and to demand replacement. They had the greatest difficulty in making people understand when they needed larger pipes or other fittings to get the gas through to the best advantage; and in view of this position, he thought it was necessary for undertakings to supply the higher calorific value. In regard to price, they were very much up against trouble with the enormous electrical competition and varying rates of charges; and the work Mr. M'Lusky was doing at Halifax was on proper lines in the direction of increasing consumption. He was afraid the gas industry was losing some lighting business to electricity because the people thought they were getting electricity at very low cost. They paid a fixed proportion of rateable value as a basis, and got their units, in Bradford, at 1d., and many of them believed they were buying electricity at 1d. per unit. Many persons who were having electricity put in would find it not so cheap as they imagined; but, of course, there were a lot of people to whom the question of a few pounds did not matter seriously, and they would stick to electricity because of its supposed cleanliness, &c. It would probably be to advantage if the gas industry could meet this competition with a similarly varied tariff; and the line Mr. M'Lusky was working on at Halifax looked as though they were going to achieve that object.

Mr. A. W. ARNOLD (Bradford), in regard to gas charges, thought that, in times like the present, when large numbers of people were working only about half the year, there would be difficulties if an undertaking guaranteed to sell gas at 2s. per 1000 c.ft. on top of a certain flat-rate basis; and most factories were using only half the quantity because they were shut-down half the year.

Mr. J. BRIDGE (Elland) said they all highly appreciated the wonderful address which Mr. M'Lusky had given. Had they been able to study it ahead they would have been able to discuss it more fully and with greater accuracy. As it was, they were rather handicapped by the fact that they could not immediately grasp everything, particularly the references on the chart, which, no doubt, they would all study more closely subsequently. Mr. M'Lusky, in his opening observations, had made some very complimentary remarks about the Juniors. Such remarks, it must be remembered, carried with them an obligation to Juniors to live up to them; and the necessity to do this was a great advantage to themselves and to the industry as a whole. They had come there that day as much to listen to words of wisdom as to discuss; and they had certainly heard words of wisdom. Mr. M'Lusky's offer of attractive facilities for gas was not merely confined to Halifax, but extended to some outer areas. On the subject of price, Mr. Bridge said there was little question that if they sold at a low rate they would increase consumption. Even if prices were reduced there would be a number of people who adopted electricity for lighting, because it was fashionable at the moment. People always would flock to something which they thought was new and fashionable, even if in many ways it was not as satisfactory as something older.

Mr. J. H. CLEGG (President of the Manchester Junior Association) said he had been keenly interested in the address. He would like to have the opportunity of talking a good deal to Mr. M'Lusky on the matters he had raised. He certainly was greatly in favour of a high-value gas. He realized that the distribution department was a very heavy drain in the cost of selling gas, and they must do all they could to ease this drain. Recently he had to consider costs fully in a job in which he had to compete with steam in a works. He found gas could beat electricity easily in that works; but with steam they were up against a more serious proposition, though they ran it pretty close. It was essential for him to get out the proportion of cost of manufacturing the gas into the holder and the distribution costs, and he found the latter appalling. At the same time he thought gas was one of the fuels which could be most cheaply distributed, though they had to bear standing charges which were not borne in the price of some other fuels. For instance, the wear and tear of roads by coal wagons was not borne by the coal consumer as such, but by him and also the gas consumer as taxpayers. Mr. M'Lusky had mentioned the matter of



DESCRIPTIVE NOTES TO CHART.

ANALYSIS OF EXPENDITURE FOR YEAR ENDED MARCH 31, 1923.

A.—Manufacturing charges.
B.—Distribution and standing charges.
C.—Net profit.

The horizontal lines A, B, and C show the cost and net profit for the year.

On the basis of these charges, all the gas manufactured could be supplied at the average price of 3s. 4·09d.

The curved line D on the chart shows another method of distributing the charges A and B.

The curve illustrates the case of a consumer whose maximum demand for lighting purposes is fixed at 20,000 c.ft. per annum. Under the Halifax "Standard Requirement" scheme—which has been in operation for six years—the consumer is charged the ordinary rate for the "Standard Requirement" volume of gas (which varies according to the size of the house), and a lower rate for all gas used in excess of that volume.

The alternative to the "Standard Requirement" scheme provides that the consumer may elect to pay a fixed charge of 1d. per week for every 1000 c.ft. in the "Standard Requirement," and be charged 2s. per 1000 c.ft. for all gas consumed.

The curved line D on the chart shows the incidence of the fixed charge in the case of a consumer whose fixed charge was 20d. per week, 21s. 8d. per quarter, or 86s. 8d. per annum.

If the consumer only used 20,000 c.ft. of gas per annum, the average price per 1000 c.ft. would be 6s. 4d.—2s. for gas, and 4s. 4d. for fixed charges.

If the consumer used 64,640 c.ft. of gas per annum, the average price per 1000 c.ft. would be 3s. 4·09d. (equal to the total cost of manufacturing, distribution, and standing charges over the year)—2s. for gas, and 1s. 4·09d. for fixed charges.

If the consumer used 160,000 c.ft. of gas per annum (a volume of gas which is burned by some consumers in houses of this size in Halifax), the average price per 1000 c.ft. would be 2s. 6·5d.—2s. for gas, and 6½d. for fixed charges.

The Gas Department would receive:

	Gas.	Fixed Charges.	Total.	Average Price per 1000 C.Ft.
	s. d.	s. d.	s. d.	s. d.
On a consumption of 20,000 c.ft. per annum	40 0	86 8	126 8	6 4
On a consumption of 64,640 c.ft. per annum	129 4	86 8	216 0	3 4·09
On a consumption of 160,000 c.ft. per annum	320 0	86 8	406 8	2 6½

	s.	d.
20,000 c.ft.—		
Revenue	126	8
Manufacturing charges	26	6·4
Surplus available for B and profit C	100	1·6
64,640 c.ft.—		
Revenue	216	0
Manufacturing charges	85	9
Surplus available for B and profit C	130	3
160,000 c.ft.—		
Revenue	406	8
Manufacturing charges	212	3·2
Surplus available for B and profit C	194	4·8

improvement of apparatus for supplying gas. This was a very important point; and he believed it would be a most valuable help to the industry if the prices of apparatus were brought down. Apart from the question of profits made by the manufacturers, there was too great a liability to introduce into apparatus a lot of little features which were improvements to anybody who could afford the extra luxury, but which were not strictly necessary to the efficient cooking of the people's joints or the ordinary daily service required (say) from a gas cooker or boiling ring. All these little things gradually piled-up the cost, and militated against the sale of apparatus and the sale of more gas. Before the war one could sell a good grade cooker of general utility for about £3 10s., and such a cooker was now £9 or £10. Working people—especially in times like the present—could not afford to pay for splash plates, plate racks, &c., on their cookers. As to electricity, it was not a bit of use worrying about the inroads of that commodity. It was there to be fought, and he did believe it would get a large proportion of the lighting demand, particularly domestic. It was a fashion, and the people who could afford it were willing to pay. He believed electricity ought to be generated by gas, and felt there was a big field in this direction for the gas industry to develop.

Mr. C. H. CHESTER (Newark) said he took it that Mr. M'Lusky based his original flat-rate charge more particularly on capital expenditure; and he thought this was where the question of high or low grade gas came in. In his town they sold low-grade gas, not because they favoured it for itself, but because of its influence on capital expenditure. The cost of manufacture of low-grade gas was less than that of higher grade gas; and if one followed the lines of Mr. M'Lusky's address, he rather imagined the conclusions of those in charge of his undertaking were correct. Mr. M'Lusky's original remarks seemed to bear more particularly on capital cost. The question of distribution came afterwards. Low-grade gas paid, on the lines laid down by Mr. M'Lusky.

Mr. F. A. C. PYKETT (Halifax) remarked that electricity seemed to secure much of the lighting demand; but there was one type of gas lighting which was ousting electric light for shop front lighting and for a number of other services—and this was the high-pressure system. In Halifax they had materially exceeded their pre-war number of lamps, and were steadily displacing electricity in this direction.

Mr. M'LUSKY said that Mr. Pykett was out for the good of the consumer; and knowing gas could give this benefit he was developing a growing business and delivering the goods, in regard to which he (Mr. M'Lusky) entirely agreed. He maintained that the gas in Halifax

was as good as any at the point of ignition—and this was the point where the quality of gas mattered. It was 425 B.Th.U. gross, for the past year. Their complaints at Halifax were 1 per 8000 a day from non-lighting consumers, and from lighting consumers there were 60 during the whole of the past month. He held that it was the merest form of affectation to call 500 B.Th.U. gas high-grade gas to-day. Mr. Roper mentioned having no right to inspect consumers' fittings. He (Mr. M'Lusky) had never had any such authority by law; but he knew of no law which prevented him from inspecting them if he thought that it was going to improve the service to the consumer. As to lighting, he was not prepared to admit that the gas industry was losing lighting business. In Bradford, Mr. Roper had mentioned, electricity was 1d. per unit *plus* a proportion of rateable value. In Halifax it was 1½d. similarly. Reckoning gas down to the unit basis, the price of Halifax was ¼d. per unit, and nothing else to pay. They gave as much heat from 10 c.ft. of gas as was furnished by a unit of electricity, and it was for the gas industry to tell the people so, and make them see which was the cheaper commodity. The new charges at Halifax, to come into operation at the beginning of the next financial year, worked out, for a house rated at about £30 per year, at (say) 9s. 9d. per annum and 2s. per 1000 c.ft. on gas consumed. Mr. Bridge had put a cryptic question as to the quality of Halifax gas. He might say that Halifax gas, like the cow that was for sale, "spoke for itself." This was a reply as cryptic as the question. In answer to Mr. Clegg, the Halifax scheme had been devised to compete with raw coal. He might say the best gas consumers they had were those who used electricity, because they were people who were fond of luxury; and the very instincts that led them to electricity for lighting would lead them also to keep coal dirt out of the house if the Gas Department would supply them with good gas-fires. He agreed entirely with Mr. Clegg as to the extras on gas-cookers, &c. The National Gas Council cookers would get over this difficulty very considerably. He also agreed as to the desirability of electricity being generated by gas.

Mr. E. J. SUTCLIFFE (Bradford), proposing a vote of thanks to Mr. M'Lusky, said the address was full of food for thought. It had touched on the politics and administrative side; and he certainly did not agree with people who held that this was a side which should not be introduced into Junior Association meetings.

Mr. P. M'NAB seconded the proposition, which was heartily carried.

Mr. M'LUSKY, responding, said he wished to emphasize the power of little things. In regard to politics, he knew no particular party in the sense of party politics; but he thought it would be impossible for a man to live in this country to-day and not be a politician in the highest sense of the word. The administrative aspect of the industry was a perfectly suitable subject to come under discussion by members of the Junior Associations.

THE LEEDS UNIVERSITY.

On the motion of Mr. R. N. WEBB (Leeds), seconded by Mr. H. S. BOYES (Harrogate), the thanks of the meeting were accorded to the University authorities for the use, as on many previous occasions, of the room.

Prof. J. W. COBB, in response, said the University authorities were always glad to render this facility to the Association. Though perhaps he was a little out of order, he would ask leave to express his appreciation of Mr. M'Lusky's address. It had dealt with aspects of the industry with which his own (Prof. Cobb's) concern was not so direct as it was with some other phases, but it was undoubtedly an aspect of great importance. He was glad to hear Mr. M'Lusky's insistence on the thesis that in some form or other the progress of the gas industry would depend on its power to replace the use of raw coal, and that this was largely to be determined by the price at which the replacing commodity could be sold. What he had had to say about the differences in price, &c., was all working towards that one end. Exactly how it worked out, it was not so easy to grasp, approaching a subject of that complexity for the first time; and he felt some sympathy with those members who did not feel able to criticize an expert on an address which they had not had an opportunity of seeing beforehand. He wished to offer thanks for the invitation to his colleagues and himself to be present. In that Department they placed themselves very definitely at the disposal of the gas industry, and he would like to take the opportunity of saying a few words respecting some facilities which were offered through the University, particularly to the younger members among gas engineers who were junior to most of the members of that Association. In Leeds and in the West Riding area there were considerable numbers of young men who had gone straight from school into the works, but were keen to be given University technical training; and in order to open-up opportunities to such men, the University authorities, together with the Leeds and West Riding Education Committees, had instituted a form of technological scholarship which was not given as a result of examination in school subjects, but on a man's record in technical classes and in works practice, followed by a *viva voce* examination, from which candidates were selected who promised a likelihood of making good in a University course. These scholarships were free, and included a small maintenance allowance. He believed that, though these had been in existence some years, many people did not know of them. He called attention to them in case they might be interesting to some members of the Yorkshire Junior Association, or to some of the younger men in their charge. He would call attention, also, to the trouble the University authorities had been to during the Spring term to secure lecturers from every part of the country—all experts, who lectured on specialized subjects in the evenings at the University. The arrangement of the lectures was specially made to be convenient to people who came in from the country area, and even beyond that, by train. There were two lectures given on the one evening, with an interval of half-an hour between, so that people from distant parts could attend two lectures without making two journeys. He did not mind confessing that, though sometimes the result of these facilities was very gratifying, at others it was disappointing. The lectures were attended by the regular students at the University; but they were specially arranged to meet the convenience of young men on the works who could not attend in the day-time.

FUEL GAS IN THE STEEL INDUSTRY.

[We have been asked to make posthumous publication of some extracts from a paper written by Mr. J. F. Denk, of Pittsburg. We do so, but at the same time dissociate ourselves from agreement with certain of his premises and deductions. We will not traverse all the arguments. But, to take one point, we cannot concur in the statement that 1 c.ft. of coke-oven gas or duo-gas (a mixture of coal and water gas of 426 B.Th.U. per c.ft.) will do the same work as 1 c.ft. of natural gas. It is contended that one reason for this capacity of the latter is the large amount of ballast in the form of nitrogen that is brought along by the 10·64 c.ft. of air required by the natural gas of 1018 B.Th.U. per c.ft., as compared with the 4·06 c.ft. of air required by the coke-oven gas, and the 3·84 c.ft. needed by duo-gas. In proportion to the respective thermal values, there is very little difference in the amount of air required. There is in a cubic foot of natural gas 2¾ times as much heat as in duo-gas; and 2¾ times the 3 84 c.ft. of air required for the combustion of the duo-gas is 8·64 c.ft., so that, even assuming the figures to be correct as given by Mr. Denk, the extra "ballast" passed in (in relation to thermal value) for the combustion of the natural gas is represented by only 2 c.ft. of air. We cannot on this one consideration alone admit that 1 c.ft. of duo-gas will do the same work as 1 c.ft. of natural gas.—ED. "G. J."]

The following extracts are taken from a paper published in the "Iron Age" in February last. Written by Mr. F. J. Denk, who was a consulting engineer practising at Pittsburgh, there are one or two points of interest to our readers.

The fuel gases mostly applied up to the present time in the steel industry in America are natural gas and producer gas. The use of natural gas is decreasing rapidly on account of the increasing shortage of this fuel. In many mills it has been replaced by producer gas; but, during the last years, the increase in the number of coke-oven plants has made available large quantities of medium-grade coke oven gas, which is used in open hearth furnaces and for other purposes in the steel plant. Coke-oven gas is a better substitute for natural gas than is producer gas, but it cannot be produced everywhere. It is, therefore, necessary to turn, for certain purposes, to another fuel which will work like coke-oven gas. This gas the author claims has been found in the so-called duo-gas, which is a combination coal gas and water gas. Tests made in the United States have shown that 1 c.ft. of coke-oven gas can do the same work as 1 c.ft. of natural gas, notwithstanding the fact that the heating value of the latter is more than twice that of the former.

The efficiency of a fuel depends upon the amount of heat which can be made available for the work to be done. This amount, in turn, depends upon the flame temperature, and the latter upon the quantity and specific heat of the waste gases. The heating value of the gas is, therefore, of no influence upon the efficiency, but of large influence on the "pyrometric" efficiency. The heat available in a furnace and provided by a certain kind of fuel in a unit of time can be found by dividing the available heat by the volume of the waste gases. If Q = total heat, and V = volume of the waste gases, then $\frac{V}{Q}$ = the heat entering the furnace during the time unit. According to the laws of heat transmission, the heat which can be made useful for operation will be: $Q_1 = e \times \frac{V}{Q}$.

The heat transmission by convection is: $Q_1 = z \times k \times d_m$. For the comparison of different fuels, the heat transmission coefficient k is constant. The same holds good for z, which represents the time for the heat transmission for different fuels at the same efficiency. It is, therefore: $e \times \frac{Q}{V} = d_m$ or $e \times Q = d_m \times V$. But, for the same work of all the fuels, the left side of the equation—*i.e.*, $e \times Q$—is constant. For this reason, the measure for the comparison of the fuels is represented by the right side of the equation. This means that the criterion for the efficiency of a fuel is the volume of waste gases multiplied by the difference between the flame temperature and the working temperature, or, in other words, that the efficiency of a gaseous fuel depends upon its "pyrometric" efficiency.

This result can be expressed by an equation which will permit the calculation of comparative values of different fuels. The equation reads:

$$E = \frac{T_t - T_b}{T_g - T_b} \times \frac{V_t}{V_g}$$

E represents the equivalent value of the new gas in comparison with the one used before, or the one which it shall replace.

T_t represents the actual flame temperature of the new gas.
T_g represents the actual flame temperature of the old gas.
T_b represents the temperature in the furnace (working temperature).
V_t represents the volume of waste gases per cubic foot of the new gas under operating conditions.
V_g represents the volume of the waste gases per cubic foot of the old gas under operating conditions.

This formula will be used later for giving comparative values,

after the properties of the different gases in question have been described and explained in detail.

TABLE I.—*Properties of Industrial Gases.*

Gas.	Natural Gas.	Coke-Oven Gas.	Duo-Gas.	Producer Gas.
*Methane CH_4	83·0	23·1	11·0	2·6
*Ethane C_2H_6	16·4	..	..	..
*Ethylene C_2H_4	..	1·6	1·0	0·6
*Benzole C_6H_6	..	0·6	2 0	..
*Carbon monoxide CO	..	4·9	34·0	22·0
*Carbon dioxide CO_2	..	1·5	3·0	5·7
*Hydrogen H_2	..	55·5	47·0	10·5
*Oxygen O_2	..	0·8	..	0·4
*Nitrogen N_2	0·6	12·0	2·0	58·2
*Total	100·0	100·0	100·0	100·0
Air required per c.ft.	10·64	4·06	3·84	1·10
Total gas-air mixture	11·64	5·06	4·84	2·10
B.Th.U. per c.ft. gas-air mixture	87·4	84·0	88·0	63·3
Waste gases, c.ft. per c.ft. fuel gas	11·723	4·755	4 445	1·923
B.Th.U. per c.ft. waste gas	86·84	89·38	95·80	67·39
Flame temperature, ° Fahr.	3226	3302	3400	2673
Wt. per c.ft., lb.	0·048517	0·030003	0 043019	0·067202
Specific heat	0·6362	0·3933	0·5641	0·8812

* Per cent.

Analyses and properties of the four steel-industry gases are given in Table 1. The figures indicating the B.Th.U. per c ft. of gas-air mixture have been added because the values given have often been cited as a proof that there is not much difference between the various gases—with the exception, of course, of producer gas, which, on account of its high percentage of inerts, appears to be in a class by itself. The values for the three other gases are 87·4, 84·0, and 88·0 B.Th.U. per c.ft. of gas-air mixture, respectively. The corresponding flame temperatures are 3226°, 3302° and 3400° Fahr., or an increase between natural gas and coke-oven gas for decreasing heat value of the mixture, and an increase again between the coke-oven gas and duo-gas for an increase in heating value. The discrepancy, however, will disappear as soon as the heat contents of the waste gases are taken into account. These are: For producer gas, 67·39 B.Th.U. per c.ft., with a flame temperature of 2673° Fahr. For natural gas, 86 84 B.Th.U. per c.ft., with a flame temperature of 3226° Fahr. For coke-oven gas, 89 38 B.Th.U. per c.ft., with a flame temperature of 3302° Fahr. For duo-gas, 95·80 B.Th.U. per c.ft., with a flame temperature of 3400° Fahr. This shows a steady increase in the flame temperature with an increase in the heat content of the waste gases, and illustrates again the interrelation between flame temperature and volume of waste gases or products of combustion.

There are two reasons why natural gas, with a heating value of 1018 B.Th.U. per c.ft., gives a flame temperature nearly 200° Fahr. below that of duo-gas with a heat value of 426 B.Th.U. per c.ft., and nearly 100° Fahr. below that of coke-oven gas with a heating value of 425 B.Th.U. per c.ft. The first is the large amount of ballast in the form of nitrogen, which is brought along by the 10·64 c.ft. of air required for combustion; the second reason is the hydrocarbons in the original gas, which, when burning, form carbon dioxide and water vapour in larger quantities than in any of the other gases in question. Both these waste gases have a much higher specific heat than nitrogen. A large amount of heat developed during combustion is, therefore, consumed to heat up these waste products to furnace temperature, and is, for this reason, made useless for furnace work. The ratio of combustible matter to ballast (not counting the oxygen) is, in natural gas, 1 to 8·46. Coke-oven gas and duo-gas, on the other hand, require less than half this amount of air. They form proportionally less carbon dioxide and water vapour; and the heat thus saved can be used for doing effective work. The ratio between combustibles and ballast is here 1 to 3·90 and 1 to 3·25 respectively. Producer gas, finally, being a very lean gas, with a ratio of 1 to 4·16, cannot develop enough heat to generate the required temperature without the use of regenerators, in which gas and air have to be preheated to a certain degree.

Under operating conditions, another disadvantage will make itself shown which, however, cannot be prevented. This is the impossibility of mixing, by natural means, the amount of air required to obtain complete and perfect combustion of 1 c.ft. of natural gas. There is no burner on the market which will mix more than 5 or 5·5 c.ft. of air with 1 c.ft. of gas in such a way that complete and perfect combustion will be obtained. Coke-oven gas and duo-gas have, therefore, a decided advantage over natural gas, because the air required is only 0·045 and 3·84 c.ft. respectively. These quantities can easily be mixed and will give good combustion. The impossibility of mixing, by natural means, more than 5 or 5·5 c.ft. of air with 1 c.ft. of gas can easily be proved when a complete analysis of the waste gases is made in a natural gas fired furnace. In most cases, these analyses are made with an ordinary Orsat apparatus, giving carbon dioxide, oxygen, and carbon monoxide. The rest is considered to be nitrogen. But the author has made a good many complete waste gas analyses, and has found a hydrogen content as high as 15 p.ct., and 3 to 5 p.ct. of methane, indicating imperfect combustion, on account of the imperfect mixture of gas and air.

It was said before that duo-gas is among the fuel gases which are of importance for the steel industry. In many instances, where natural gas is giving out, the factory manager will not be satisfied until he finds a substitute which will do the work in the same way as natural gas. In galvanizing plants, steel mills, welding plants, and forge plants, for example, raw producer gas cannot be used, and clean producer gas will not do the work at all, or only under exasperating conditions. In such cases, duo-gas is the right fuel to be applied. Or there may be a bye-product plant, furnishing coke for the blast furnaces and gas for the open-hearth and other furnaces. The coke plant may furnish enough coke, but not enough gas. There again, duo-gas will fill the want. It has the same heating value as coke-oven gas, and can easily be mixed with it, giving a flame temperature high enough to do any work in the steel plant, without the use of 5 or 6 ft. flues or regenerating chambers. Besides, an installation of duo-gas machines requires little space and not much labour. Natural gas consists of practically nothing but hydrocarbons, and for this reason preheating would be detrimental to the value of the gas. The other two gases do not contain such large quantities of hydrocarbons as natural gas; the loss under preheating would, therefore, not be so marked as with natural gas. Preheating these gases, however, is not necessary, because their theoretical flame temperatures are higher than those of natural gas. Producer gas, of course, must be preheated. These conditions naturally influence the actual equivalent values of the different gases, and change them completely.

TABLE II.—*Equivalent Gas and Heat Values for the Same Flame Temperature.** 60 *P.Ct. Excess Air.*

—	Producer Gas.	Natural Gas.	Coke-Oven Gas.	Duo-Gas.
Temperature of gas entering furnace	1300	Cold	Cold	Cold
Temperature of air entering furnace	1850	1640	1520	1440
Heat value of gas, B.Th.U.	133	1018	425	426
Actual ratio (duo-gas = 1)	3·2	0 42	1	1
Amount of waste gases per c.ft. gas	1·929	11·723	4·755	4·445
Theoretical flame temperature	3400	3400	3400	3400
Actual flame temperature	2900	2900	2900	2900
Temperature of bath	2700	2700	2700	2700
Difference	200	200	200	200
Equivalent value of gas (duo-gas = 1)	2·3	0·38	0·93	1·0
Amount of heat units which will do the same work as 426 B.Th.U. in duo-gas	306	367	395	426
Equivalent B.Th.U.	0·72	0 86	0·93	1

* All temperatures in degrees Fahr.

It can be seen, comparing the heating values of the gases directly, that 3·2 c.ft. of producer gas, 0·42 c.ft. of natural gas, and 1 c.ft. of coke-oven gas are equivalent to 1 c.ft. of duo gas. If, however, the furnace heats are taken into consideration, conditions will become different. Then, 2·3 c.ft. of producer gas, 0·38 c.ft. of natural gas, and 0·93 c.ft. of coke-oven gas are equivalent to 1 c.ft. of duo-gas; and the corresponding heat values are: For producer gas, 306 B.Th U. per c.ft.; for natural gas, 367 B.Th.U. per c.ft.; for coke-oven gas, 395 B.Th.U. per c.ft.; for duo gas, 426 B.Th.U. per c.ft. One B.Th.U. in the form of duo-gas does as much work as 0·72 B.Th.U. in the form of producer gas, 0·86 B.Th.U. in the form of natural gas, and 0·93 B.Th U. in the form of coke-oven gas.

That the value of the B.Th.U depends upon local or furnace conditions can very easily be shown to be true. To illustrate this, Table III. has been compiled which gives the same relations, but worked out for different practical conditions. In this case, the actual calorific values are—for producer gas, 705 B.Th.U. per c.ft.; for natural gas, 509 B.Th.U. per c.ft.; for coke-oven gas, 446 B.Th.U. per c.ft.; for duo-gas, 426 B.Th.U. per c.ft. In other words, 1 B.Th U. in the form of duo-gas is equal to, or does the same work as, 1·65 B.Th.U. in the form of producer gas, 1·20 B.Th.U. in the form of natural gas, and 1·05 B.Th.U. in the form of coke-oven gas.

By building the furnace in the right way, the flame temperature of the fuel gas can be predetermined within small limits. Thus it is possible to increase the differences in the tables still more; and we may, for instance, obtain an actual flame temperature for the duo or the coke-oven gas of 3300° Fahr. This would bring the equivalent values between these two gases to the same figures as shown in Table III., but would increase that between the duo-gas and natural gas to 1 to 0·65—or 426 B.Th.U. in the form of duo-gas will do the same work as 662 B.Th.U. in the form of natural gas. In other words, to replace, in the case in question, natural gas by duo-gas (or coke-oven gas) it is not necessary to supply $\frac{1018}{426} = 2{\cdot}4$ c.ft. of the new fuel gas for every c.ft. of the old fuel gas, but only $\frac{662}{426} = 1{\cdot}56$ c.ft.

What this amounts to in dollars and cents can easily be seen from the following calculation: Suppose a factory uses 1·5 million c.ft. of natural gas per 24 hours for a certain purpose, paying 50c. net per 1000 c.ft. This would amount to a fuel cost of $750 per day. To replace this quantity by 1,500,000 × 2·4 = 3 6 million c.ft. of duo-gas, the manufacturing cost of which is less than

TABLE III.—*Equivalent Gas and Heat Values for Different Flame Temperatures.** 60 *P.Ct. Excess Air.*

—	Producer Gas.	Natural Gas.	Coke-Oven Gas.	Duo-Gas.
Temperature of gas entering furnace	1300	Cold	Cold	Cold
Temperature of air entering furnace	1850	1850	1850	1850
Heat value of gas	133	1018	425	426
Actual ratio (duo-gas = 1)	3·2	0·42	1	1
Amount of waste gases per c.ft. gas	1·929	11·723	4·755	4·445
Theoretical flame temperature	3400	3550	3610	3660
Actual flame temperature	2900	3050	3110	3160
Temperature of bath	2700	2700	2700	2700
Difference	200	350	410	460
Equivalent value of gas (duo-gas = 1)	5·30	0·50	1·05	1·00
Amount of heat units which will do the same work as 426 B.Th.U. in duo-gas.	705	509	446	426
Equivalent B.Th.U.	1·65	1·20	1·05	1·00

* All temperatures in degrees Fahr.

20c. per 1000 c.ft., would leave the fuel cost practically the same, or at $720 a day. But taking the other equivalent, 1,500,000 × 1·56 = 2·35 million c.ft., will reduce the cost to $470—a saving of $280 per day. Such a saving would pay for the plant in a comparatively short time.

In Europe, where there is no natural gas in the districts where the steel industries are located, it has been found that, when compared with producer gas, coke oven gas is much more efficient and economical than raw producer gas. This could not be the case if it were necessary to replace one gas by the other according to heat values. In the United States direct comparisons of the equivalent quantities of natural gas and coke-oven gas were possible; and they have proved that, under right furnace conditions, 1 c.ft. of coke-oven gas will do the same work as 1 c.ft. of natural gas. Of course, it must be kept in mind that a furnace must be charged to suit the new fuel.

Meter Making by Gas.

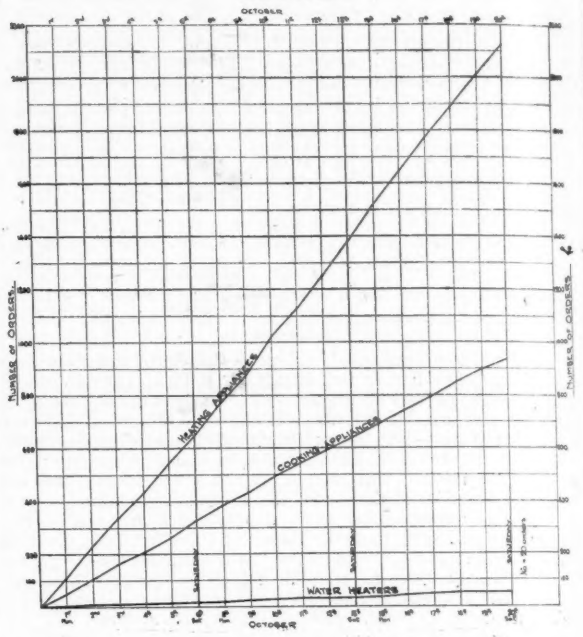
The excellent results obtained by the Hersey Manufacturing Company, of Boston, with the aid of gas in the manufacture of their water meters, are recounted by Mr. J. E. Bullard in the pages of the "Gas Age Record (Oct. 13). Gas is used for heating a 600-lb. alloy furnace; but the big heat requirement is in the casting department, for the melting of the brass alloy of which the castings are made. Here, the furnace will take a crucible having a capacity of 125 lbs. of metal. The burner—a No. 3 "Premix" brass-melting burner—is installed outside the furnace; the flame passing through an opening in the side of the furnace a few inches from the burner. The consumption measured over a period of months shows that between 5¾ and 6 c.ft. of gas is needed to melt a pound of brass. Comparative records with the two fuels indicate that, while with coke from 32 to 34 melts can be made in a crucible, with gas the crucible is good for between 40 and 42 melts. This lengthened life means much more than the saving in crucible cost alone. It means, for one thing, that a smaller battery of furnaces will serve for a given volume of melting. The labour required in changing the crucibles is reduced; and there is a considerable saving in fuel, because it is not necessary to allow a furnace to cool down so often. Another decided advantage in the use of gas is in connection with the metal loss. With coke this loss is found to run to 6½ to 7½ p.ct.; whereas with gas it has been cut down to less than 4 p.ct.—the average loss being about 3½ p.ct. This factor of metal loss is very important; uniform quality of their products being always a main object of the firm in question. Should the alloy vary to any great extent, the product will not always possess the uniformity desired. The alloy may be perfect when placed in the melting furnace, but if the heat is not under perfect control it may rise too high, and some of the metals making up the alloy may be vaporized off. The fact that gas is under perfect control is the reason why this form of heating serves the purpose better than any other fuel that can be used. That this is the case is shown by the fact that there is less spoilage in castings when gas is employed for melting. With its many attendant advantages, the writer says, it is easy to see that, in the long run, gas is bound to be by far the cheapest fuel.

Institution of Heating and Ventilating Engineers' Premiums.—In an Assistants' Prize Competition, the Council of the Institution of Heating and Ventilating Engineers are offering three awards for original papers on subjects connected with heating and ventilating, during 1924. The "Lumby Premium" of ten guineas is for the best paper dealing with heating in the generally accepted sense of the term; the "Sirocco Premium" of ten guineas, for the best paper dealing with fan engineering, &c.; and the "Preston Premium" of five guineas, for the next best paper on any subject included under these two headings.

A GLASGOW EXHIBITION SUCCESS.

Remarkable success attended the display of the Corporation Gas Department at the Glasgow Housing and Health Exhibition, which was held in Kelvin Hall from Oct. 1 to 20. The nature of this success is graphically revealed by the accompanying chart relating to orders booked during the run of the exhibition.

ORDERS BOOKED DURING THE PERIOD OF THE EXHIBITION, Oct. 1 to 20.



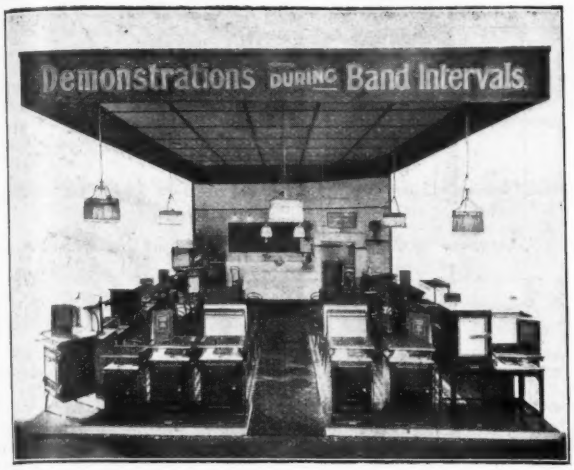
View of Fire Station and Cookery Pavilion, as seen from the Band Auditorium.

[The word "Gas" was made, by arrangement, of whitened "Sunbeam" radiants.]

View of Cookery Demonstration Pavilion from Band Auditorium.

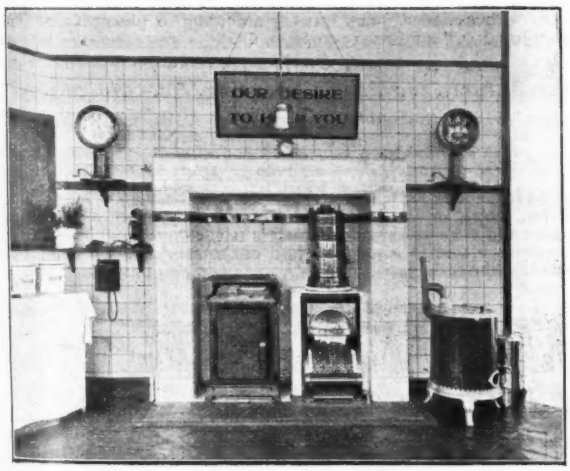
tion; and its extent will not be wondered at when a study is made of the photographs of the exhibit, which are more expressive than any written description could be.

The Corporation were, explained "Building Industries," represented by two stands near the band platform. Of these, one was named the "Fire Station," and was decorated in the red and gold usually associated with fire stations. On this stand there were



Second Photograph of Cookery Demonstration Pavilion, showing Seating Accommodation for Sixty Persons, in addition to which a crowd usually gathered round the outside during the lectures.

massed 500 gas-fires showing that any existing fireplace can be matched, as the fires on exhibit were finished in burnished brass, copper, oxidized copper, and black. Owing to the excessively wet and cold summer experienced this year, the demand for gas-fires has been continuous; and with the aid of inset fires, the department expect a record demand during the autumn and winter. They have laid in a large stock of fires in anticipation—being in a position to give an unlimited supply of gas.



Close-up Photograph of Kitchen Arrangements shown in Cookery Demonstration Pavilion.

The other stand was also on novel lines; being formed on three sides by gas-cookers. One end was fitted as a kitchen, and a special sounding-board was fixed in the shape of a roof, to enable the lady experts to be easily heard when demonstrating the efficiency and ease of cooking by gas. Chairs were also provided, and during the intervals between band performances ladies crowded this enclosure, with the object of watching the demonstrations.

Gas for Metal Cutting.—Vol. XI., No. 116, of "A Thousand-and-One Uses for Gas," published by the British Commercial Gas Association, is an eight-sided condensate of interesting and valuable information concerning the use of gas for metal-cutting and die-casting. An inexpensive and efficient oxy-coal-gas metal cutting machine, which will cut out simple or intricate shapes in metals up to 8 in. thick at a speed hitherto possible only when cutting wood, is described. This can be used with advantage and at a low cost for making press-tool dies for jig work, and for cutting-out pipe flanges, cams, wheels, arms, &c. The use of coal-gas as the pre-heating agent, it may be pointed out, ensures clean cuts with parallel walls, and does not harden the metal.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

Maintenance Cost of Vertical Retorts.

SIR,—With reference to the report, published in your issue of the 31st ult., of the discussion on the paper read by Mr. Buckley before the Manchester District Institution of Gas Engineers, I note that Mr. W. J. Smith of Bolton is reported as having stated that Mr. Buckley had given "19·25d. as the cost of gas into the holder last year, and 13·06d. as the cost this year. He supposed they might take Mr. Carr's cost at 18·2d." This is incorrect; the actual cost into holder for the six months ended June 30, 1923, at Ormskirk, was 8·9d., including coal *less* residuals, all works charges, purification, apportionment of salaries, and repairs of all works plant. This with a make of gas for the half-year of 43,000,000 c.ft. Mr. Buckley gave his cost into the holder at Droylsden at 13·06d. this year. It is presumed that this is for the period since the end of the last financial year, March 31, 1923, and for the completed year ended March 31, 19·25d. This latter figure is comparable with the Ormskirk result for the year ended Dec. 31, 1922, when the cost into holder was 16·33d. per 1000 c.ft.

The maintenance figure at Droylsden, on the basis of per ton of coal carbonized, for the years 1911-20, disregarding the gas used as being a manufacturing charge, is 9·452d. per ton, whereas the total cost of maintenance and repairs at Ormskirk over the ten years 1913-23 is 11·25d. per ton of coal carbonized—a difference of 1·8d. per ton in favour of the verticals at Droylsden. The Droylsden plant is, however, a larger plant than the one at Ormskirk, and has had the very great advantage of continuous working summer and winter. Had it been possible to run the Ormskirk plant on the same lines, the maintenance cost per ton of coal carbonized would certainly have not been any higher than, if as high as, the total maintenance cost at Droylsden.

The throughput of coal at Droylsden in the ten-year period was 99 279 tons, as compared with 73,370 tons, the quantity carbonized at Ormskirk. It would appear, therefore, that there is little, if any, difference in the cost of maintenance between well-equipped horizontal and vertical carbonizing plants. If, however, the whole working results are taken into consideration, with coal and residual prices ruling in this part of the country to-day, the advantage in respect of low cost of manufacture is with horizontals.

W. M. CARR.

Gas-Works, Stretford, Nov. 3, 1923.

Hole's Distribution of Gas.

SIR,—My attention has just been called to the fact that on pp. 592 and 593 of my book on "The Distribution of Gas," the figures have been transposed. The figure shown as 671 is really 672, and *vice versâ*.

This will, of course, be corrected in printing-off future copies. Meanwhile, will those of your readers who have copies of the fourth edition please note the correction?

WALTER HOLE.

Dentdale, Barton, Torquay, Oct. 29, 1923.

REGISTER OF PATENTS.

Coke Recovery.—No. 204,264.

ARPIN, J. B., of Wisconsin.

No. 3363; Feb. 5, 1923.

This specification describes in detail a hydraulic plant for the separation of coke from ashes. The invention apparently includes the means provided for transporting and feeding the material; the actual separation taking place in a well of water.

After passing through a rotary screen for the removal of the breeze, the ash is carried by a stream of water into a hopper carriage over the well. Into the side of the well is led a broad mouthed funnel, to the small end of which is attached a pump which preserves a suction effect. The ash is allowed to fall in a broad stream through the water in the well; and as it passes the funnel mouth (the position of which is adjustable relative to the falling ash) the lighter pieces of coke are drawn into the funnel, while the clinker goes on to the bottom of the well. This is the principal feature of the invention, though the complete plant—feeding and removing gear, &c.—is covered.

Registering Mechanism for Gas-Meters. No. 204,461.

WELLINGTON, S. N., and COOPER, W. R., both of Victoria Street, S.W. 1.

No. 21,241; Aug. 3, 1922.

"Since gas companies and public authorities have changed the basis on which they sell from one of volume to one of thermal value, consumers have become confused as to the extent of their liability," say the patentees.

With this conviction, they have devised a modification of the registering mechanism of a gas-meter, whereby a selected wheel of the indicating train is made to carry an electric contact. On the closing of the circuit once every revolution, an impulse is given to the first wheel of a second train which indicates in therms.

It is suggested that "the electric current may also be caused to ring a bell, so that the consumer is warned that a definite quantity of gas has been used."

Gas-Cleaning Apparatus.—No. 204,274.

ANDERSON, N. M., of Haslev, Denmark.

No. 7678; March 16, 1923.

This invention relates to the removal of impurities from gas, and is specially designed for dealing with gas rich in tar. The apparatus consists mainly of a zigzag pipe of rectangular cross-section, in which water and the gas are circulated. Instead of being in counter-flow, however, both the water and the gas pass from top to bottom of the serpentine pipe; the water being splashed and sprayed from side to side by the bends in the pipe. This effect is enhanced by the interior pipe surface being curved inwardly at the more acute angles. Suction is set up in the tube by the water and gas flowing in the same direction. A cleaning cover is provided at the outside of each bend; and gas and water offtakes are provided for.

Securing Trucks in Rotary Tipplers.—No. 204,427.

DEMPSTER, R., & SONS, LTD., and HARGREAVES, W., both of Elland.

No. 18,537; July 6, 1922.

This invention provides means for mechanically clamping and holding trucks in position in a rotary tippler. This is effected by the operation of top and bottom sets of buffers (four in each set) which grip the upper and lower edges of the truck body.

The motion of these buffers is imparted by vertical screws carrying nuts on which are fulcrummed two-armed levers connected to vertical rods which actuate the upper buffers and to limbs which actuate the lower ones. Rotary motion is imparted simultaneously to all the screws through gearing driven by hand or power. The example illustrated and described in the specification has an electric motor for the purpose; and for each vertical screw there is interposed an independent frictional driving clutch, so that pressure on the buffers is automatically equalized and limited.

Change from Prepayment Meters.—No. 204,557.

BRADING, H. C., of Holloway, N.

No. 28,692; Oct. 21, 1922.

This invention relates to the giving of change by a prepayment meter; the arrangement consisting of a slide which is released by the weight of a sixpence bearing on a lever.

Pennies which have performed their function fall into the mouth of a conductor, in which they travel in a circular recess in the slide. When six pennies have collected, their weight on a lever causes an indicator on a vertical arm to show above the coin-plate. A sixpence is then inserted in a slot and is led down to a point near the back of the slide where it weighs down a lever (carried by the slide) the other end of which has hitherto been in engagement with a retaining rod. This frees the slide, which may be withdrawn to allow recovery of the six pennies all at once; the sixpence falling into the money box. A plate mounted on the slide prevents interference with other pennies in the conductor.

Manufacture of P-Nitrophenetole from P-Nitrochlorbenzene.—No. 204,594.

LEWCOCK, W., of Beckton, E. 16, and THE GAS LIGHT AND COKE COMPANY, of Horseferry Road, S.W. 1.

No. 32,969; Dec. 2, 1922.

P-nitrochlorbenzene may be converted into *p*-nitrophenetole by heating with an alkaline reagent such as sodium ethoxide. If, for instance, this nitrochlor-derivative be boiled with alcoholic sodium ethoxide, *p*-nitrophenetole is formed. At the same time, however, a substantial quantity of dichlorazoxybenzene is produced. On the other hand, if the process be conducted at a temperature below the boiling point of the alcoholic solution, in order to avoid the formation of azoxy-compounds, completion of the reaction is greatly protracted.

The patentees have found that by appropriate adjustment of the conditions under which this reaction is conducted the latter may be carried out both with reasonable expedition and with avoidance of the formation of bye-products of the kind in question, and hence with general economy in the production of the compound desired. They claim:

1.—The manufacture of *p*-nitrophenetole by a process wherein *p*-nitrochlorbenzene is heated in aqueous alcoholic solution with an alkaline reagent, such as sodium ethoxide, characterized by heating a solution of the chloro-derivative of low concentration (for example, of the order of about 3 to 5 p.ct.) with a quantity of the alkaline reagent not substantially in excess of that chemically equivalent to the derivative at or above the normal boiling-point of the aqueous alcohol, with avoidance of ebullition.

2.—A process as above, characterized by the use of less alkali than that chemically equivalent to the derivative, for the purpose described.

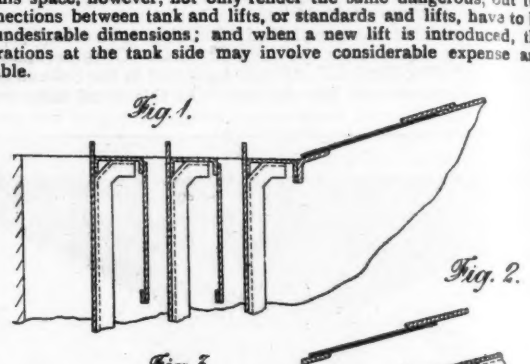
3.—A process characterized by heating the reaction-mixture without ebullition to a temperature of 90° to 120° C.

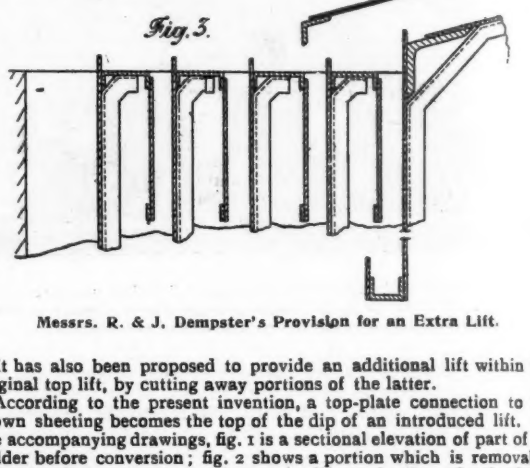
Adding Lifts to Gasholders.—No. 204,628.

DEMPSTER, R. & J., LTD., BEARD, G. F. H., and SCOTT, J. W., all of Manchester.

No. 2151; Jan. 24, 1923.

The patentees point out that it is now becoming common practice to construct telescopic gasholders with a greater number of lifts; and to provide for a possible increase, gasholders are now being constructed in a manner which will enable them to be converted at a later date for an increased number of lifts. This provision has commonly been attained by leaving an extra space between the sides of the tank and the outermost lift of the holder, to allow of the insertion of an additional lift, or more than one, after cutting away portions of the original lift. The dimensions of this space, however, not only render the same dangerous, but the connections between tank and lifts, or standards and lifts, have to be of undesirable dimensions; and when a new lift is introduced, the alterations at the tank side may involve considerable expense and trouble.





Messrs. R. & J. Dempster's Provision for an Extra Lift.

It has also been proposed to provide an additional lift within the original top lift, by cutting away portions of the latter.

According to the present invention, a top-plate connection to the crown sheeting becomes the top of the dip of an introduced lift. Of the accompanying drawings, fig. 1 is a sectional elevation of part of the holder before conversion; fig. 2 shows a portion which is removable, allowing of reconstruction with an extra lift on the lines clearly shown in fig. 3.

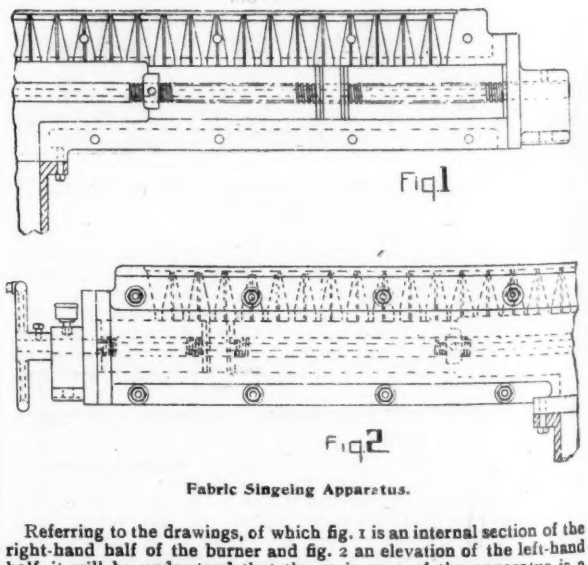
The invention is applicable to gasholders with different types of guiding means and tanks. To avoid employing extensive roller carriages in the case of ordinary guide framing being used, lifts may be added with extended guide framing according to patent No. 188,618 [see "JOURNAL" for Dec. 13, 1922, p, 686].

Gas-Burners for Fabric Singeing, &c.—No. 204,756.

EWING, A., of Ramsbottom, HENSHILWOOD, A. B., and GRAHAM, C., both of Bradford.

No. 17,980; June 30, 1922.

This invention relates to gas-burners for use in machines for singeing fabrics, yarns, or the like. The object is to produce a flame of a thinner and more continuous character than heretofore, while its length may be regulated to meet the width of the fabric or the number of threads without the least loss of gas when carrying out adjustment.



Fabric Singeing Apparatus.

Referring to the drawings, of which fig. 1 is an internal section of the right-hand half of the burner and fig. 2 an elevation of the left-hand half, it will be understood that the main part of the apparatus is a cylinder of a length which enables it to reach from end to end or side to side of the machine. This tubular member is formed in halves, each half having two lateral flanges.

The upper flange has grooves which radiate from the periphery of the semi-cylindrical part towards the outer edge of the flange. These grooves are narrower towards the interior of the tubular part than they

are at the outer edge, so that facets are produced to form joints with the facets on the opposite flange. As a result, the spreading of the combustible mixture towards the outer edge as the egress slot is approached has the effect of producing a continuous flame from end to end of the burner. To ensure the perfect continuity of the flame, a narrow central groove is formed in each facet on each flange.

In manufacture, the two halves are bolted-up, and the burner is then drilled so that a perfect surface is formed for the reception of two pistons. These pistons are bored and screw-threaded, one with a left-hand thread and the other with a right-hand thread, to take over respective portions of a screwed shaft. The end parts of the cylinder form bearings and afford facilities for lubrication.

The position of these pistons may be varied by means of a hand-wheel, so that the attendant can control the width of the flame. The pistons have rings, and projections on them are held by springs into a groove in the burner body. Other details of the apparatus will be seen from the drawings.

Controlling and Proportioning Flows of Combustible Fluid.—No. 204,826.

IGRANIC ELECTRIC COMPANY, LTD., of Queen Victoria Street, E.C. 4.

(A communication from the Cutler-Hammer Manufacturing Company, of Wilwaukee, Wisconsin.)

No. 21,926; Aug. 11, 1922.

This invention relates to a method of, and apparatus for, controlling and proportioning flows of combustible fluid, particularly to apparatus in which the rate of flow of one of a plurality of component streams of fluid is adapted, by the action of a calorimeter supplied by the composite stream formed by the admixture of the component streams, to be automatically arranged in such manner as to maintain at a desired value the calorific value of the composite stream. The object of the present invention is to provide a more sensitive and accurate apparatus of this kind; and the invention may be said to consist broadly in the arrangement according to which a Wheatstone bridge is adapted to become unbalanced by the action of the calorimeter when the calorific value of the composite stream differs from the desired value, and wherein the control of the component stream is effected by electrically actuated ratchet mechanism operating in response to such unbalancing.

It is preferred that the calorimetric device which forms an important part of the controller shall comprise the apparatus covered by Patent No. 153,817. This describes the Thomas calorimeter.

Bunsen Burners.—No. 204,969.

JONES, W. A., and BRADLEY, H., both of Manchester.

No. 32,809; Dec. 1, 1922.

This invention has reference to bunsen burners of the kind in which the admixture of the gas and air is assisted by a fan located within the mixing chamber and rotated by the gas. The object is to provide an improved arrangement whereby the fan may be more easily fitted in position and adjusted.

The fan is detachably and adjustably mounted on a frame carried by, or mounted on, a thimble-shaped member provided with diverging holes in its end for the passage of the gas, and adapted to be secured at the end of the gas passage of the burner, so as to bring the fan into the mixing chamber. The actual bearings of the fan are perfectly jewelled to minimize friction.

Treatment of Coal Tar.—No. 204,976.

RICHARDS, W. E. W., of Ealing, and the SILUMINITE INSULATOR CO., LTD., of Dowgate Hill, E.C. 4.

No. 34,642; Dec. 19, 1922.

This invention relates to a process for obtaining a soluble pitch-like material from gas, coal, or wood tar.

Dehydrated tar is placed in a suitable vessel, which must be so arranged as to enable the tar to be heated and to have air blown through it. The charge is heated to a temperature of about 100° C., when about 5 p.ct. of concentrated sulphuric acid is added. It is not generally necessary to stir the mixture, but air is blown violently through it; the temperature being maintained at about 100° C., when the blowing commences, but the heating being then discontinued The blowing is continued for five to ten minutes, after which the tar will be found to thicken considerably. Blowing is continued for about five minutes after the commencement of the thickening, after which the material is allowed to settle. Pitch will at once be found to separate at the bottom of the vessel, while the lighter oils will float at the top.

The two layers are then separated in any convenient manner. The pitch may be run off through an outlet provided at the bottom of the vessel; the lighter oils may be drawn off by means of an aspirator, or any other suitable method may be employed.

The soluble pitch-like material is obtained from the lighter oils by distillation, in such a manner that the temperature of the distillate in the head of the still is kept at or near 400° C. The residue left in the still will be found to consist of the required material, of which it is possible to obtain 33 parts by weight from 100 parts of tar. The distillate can be used without further distillation for fuel purposes.

Inverted Gas-Mantles.—No. 205,027.

SLOMAN, J. & A. J., both of Canonbury, N. 1.

No. 11,194; April 25, 1923.

This invention, relating to the illumination of inverted gas-mantles, seeks to effect economy in the amount of gas consumed, by locating a body of metal, fireclay, or other refractory material in the interior of the mantle.

The refractory body, which is preferably of stream-line cross-section and with its lower edge corresponding to the curve of the mantle, has a carrying arm formed at its upper end into a book. The latter embraces with a good fit the mantle ring, but is so shaped as not to interfere with the projections which support the mantle from the nozzle.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for Oct. 31.]

Nos. 26,253 to 26,962.

ALEXANDER, R.—"Means for analysis of coal." No. 26,866.
BAILEY, R. W.—"Gas or oil power plant." No. 26,443.
BERRY, J.—"Means for giving warning of gas escapes." No. 26,387.
BULLMORE, A. W. E.—"Gas-pressure controller." No. 26,286.
DAVIES, R.—"Apparatus for recording flow of liquids." No. 26,921.
DOBLE LABORATORIES, INC.—"Apparatus for controlling flow of liquids." No. 26,493.
GAS LIGHT AND COKE COMPANY.—"Manufacture of direct cotton dyes." No. 26,327.
GORDON & CO., LTD., J.—See Davies, R. No. 26,921.
HENSHAW, S.—"Production of neutral sulphate of ammonia." No. 26,526.
HICKMAN, LTD., A.—"Burners of gas-heaters." No. 26,397.
LASSEN, J. J.—See Davies, R. No. 26,921.
LLOYD, W. F.—See Hickman, Ltd., A. No. 26,397.
METROPOLITAN-VICKERS ELECTRICAL COMPANY, LTD.—See Bailey, R. W. No. 26,443.
PARKER, F. N.—"Distillation of coal, &c." No. 26,616.
PHILLIPS, H. C.—See Bullmore, A. W. E. No. 26,286.
RUSHEN, P. C.—See Doble Laboratories, Inc. No. 26,493.
STONIER, S.—See Henshaw, S. No. 26,526.
STRUBEN, A. M. A.—"Low-temperature gravity retorts." No. 26,753.
TALK O' TH' HILL COLLIERY, LTD.—See Henshaw, S. No. 26,526.
WILKINSON, G.—"Gas-burners for heating, &c." No. 26,282.
WILPUTTE, L.—"Washing hot gas valves." No. 26,565.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—KING'S BENCH DIVISION.

Wednesday, Oct. 31.

(*Before Mr. Justice* GREER.)

SULPHATE OF AMMONIA FEDERATION, LTD., v. SOUTH METROPOLITAN GAS COMPANY.

This case, which was referred to on p. 336 of last week's "JOURNAL," again came before Mr. Justice GREER to-day.

Mr. R. A. WRIGHT, K.C., Mr. JOWITT, K.C., and Mr. LE QUESNE appeared for the plaintiffs; Sir JOHN SIMON, K.C., Mr. RAEBURN, K.C., and Mr. WYLIE, for the defendants.

Mr. WRIGHT said his Lordship had been kind enough to grant an adjournment, as it was thought the matter might be settled amicably in another way. Unfortunately, that course had been found impossible of adoption, and therefore the action would have to be tried. The action took the form of a claim for a declaration; and the defence raised certain different declarations. The object was to ascertain on what principle accounts were to be adjusted as between the South Metropolitan Gas Company and the British Sulphate of Ammonia Federation, as the Gas Company had received (without prejudice) large sums of money under an equalization scheme. The Federation would be entitled, in any event, to a substantial refund, on the ground that the Gas Company had been overpaid; but as there were certain disputes between the parties as to the true principles on which the accounts should be made up, the matter fell to be dealt with in this form rather than by bringing a money claim. The action had reference to an equalization scheme; and the particular one with which they were concerned was in operation in 1920-21. The equalization contemplated by this scheme was equalization of prices of sulphate of ammonia; and the members of the scheme were all the suphate of ammonia makers in the country, among others being the Company. During the war there was Government control over sulphate of ammonia; the control having two main objects. One was to secure ammonia for munition factories, and the other to obtain a sufficient supply of sulphate of ammonia for agricultural uses. There was also the question of export; and during certain years of the war this export was only permitted under licence. At some periods, the home demand was such that no licences were granted. Towards the close of the war, and after the armistice, questions and difficulties arose of two kinds: (1) Regarding the handling of the home agricultural demand; and (2) to control the export. The former had to be regulated to secure economy in transport charges. One great object which was being considered was how to economize transport charges by securing that the various works delivered their sulphate as near as possible to the place where the works were. Another point which became very important after the armistice was this: The prices for sulphate for home agricultural use were fixed by the Government, and there was up to a certain stage a demand for the export trade, in which greater prices could be realized. It was desirable that there should be a sufficient amount kept in this country. These were considerations of great importance, which not only interested the makers of sulphate of ammonia, but also the country, and were the subject of special regulations, first by the Government, and next by an Act of Parliament.

There had been before the war a voluntary body called the Sulphate

of Ammonia Association; and on this body there were a number of members representing the different makers, among others the South Metropolitan Gas Company. This Association remained in operation until 1920, when there was formed a Limited Company called the British Sulphate of Ammonia Federation, Ltd. This body was registered on May 26, 1920; and they were the plaintiffs in this action. They were parties to the equalization scheme of 1920-21, and were charged with the duty and obligation of carrying out the scheme as between the various parties. The Federation had a number of subscribers—in fact, when it was formed, about 90 p.ct. of all the makers of sulphate of ammonia in the kingdom became members. But there were outside the Federation a limited number of makers, the biggest of whom were the South Metropolitan Gas Company. The defendants did not become members of the Federation, and there were a certain number of smaller companies who also did not join, though many had done so since. The present action did not concern any of these makers, as the bulk of them had accepted the settlement, but only the defendant Company. The South Metropolitan Gas Company would represent about 5 p.ct. of the total production of sulphate of ammonia in the country. In 1920, the Federation had been formed, and there was an equalization scheme following upon earlier ones. There was the scheme of 1920, and the one in question. The whole object of equalization was that of prices. This took various aspects. One was that the amount received by a member might be affected by his topographical position. He might have thrown upon him a greater cost of delivery than other members might labour under, This difficulty was dealt with in the following way. There was a general power given to the Federation, as managers of the scheme, to distribute orders so as to economize transport and delivery charges; and, in addition, there was a provision that a pool should be formed which should be dealt with by a system of distribution, because if a member had to pay more than 12s. 6d. for his delivery, he was entitled to have that made good out of the pool. On the other hand, if he paid less than 12s. 6d., the balance went into the pool, resulting in a surplus, which was distributed among the members according to their production. Another aspect was that prices might differ according to the direction in which the goods were disposed of, and this difference might arise in respect of price for agricultural use, for munitions, or for export. A fourth category which he might mention, only to pass it by, was the sale of sulphate of ammonia for industrial purposes at home. This was treated as outside the scheme. One of the objects of the scheme being that each maker by coming into it should get the same price for his product, the root idea was that prices should be equalized as between the different makers, and that they should neither gain nor lose by the fact that their output was marketed in a particular direction. The greatest possibility of inequality after the war ended was that of home and export trade. The Government were very anxious to secure that nothing should be exported so as to denude the country of artificial manure, and therefore there could be no export without service.

For a considerable period the export price was about the same as the home price, and while that continued, the home figure being fixed by the Government, every one would be getting the same. The export price, however, depended on market conditions, foreign demand, and the amount available to meet it; and the supply was regulated by the Government. Therefore the export price was higher than the home price. The idea of equalization was completely and successfully carried out by simply dealing with the export trade. The home question solved itself; but if certain individuals got a licence to export, to that extent they would be getting higher prices for the goods. So the sulphate on the advantageous market was purchased by the Federation at a particular price, which had relation to the market price. For instance, the Gas Light and Coke Company might deliver a large quantity, and had they got the whole export price they would have profited over other makers. The arrangement was that the sulphate taken by the Federation should be paid for at a certain price, and that the Federation should realize the best price they could on the advantageous market; and the surplus was divided among all the members in accordance with their production. The result was that, so long as it was properly applied, every one shared alike. While the advantageous market was the export market, it was the export price which was of account; and the idea of equalization was carried out by ignoring the home market, and concentrating on the export prices. Each party got his price; and in so far as there was an export at higher prices, the extra profit was brought into botch-potch, and was allocated to each, so that each got the same price. Towards the end of 1920, problems arose of this nature: By that time foreign competition began to become operative, and the productive capacity of foreign countries had very largely increased. Up to 1911 the British sulphate of ammonia makers had had by far the greater share of the market. Then German and American competition began to operate, and exports very much diminished. During the war they were able to export a certain quantity to neutral countries; but when the war came to an end, the export markets were again occupied by foreign countries. The export market was falling; and it was seen that the home prices would be higher than the export prices. In these circumstances the equalization involved taking account of the home market. The Federation proceeded to give effect to the changed conditions; and they brought into account the home prices, so that the same result was achieved in the last two quarters as in the first two quarters of the year. It was in respect of this that there arose a difference of opinion.

His LORDSHIP said he did not understand how the South Metropolitan Gas Company came into the matter, as they were not members of the Federation.

Mr. WRIGHT said they were parties to the agreement. What was done by the Federation with the consent of all was that they took over the home production as well as the foreign production, and dealt with it, and apportioned the result, thereby making for equalization. One of the questions raised was whether what the Federation did was within the equalization scheme or not. In addition, the Federation had to deal with three other matters which had to be considered. They had encouraged farmers to buy in advance; and rather lower prices were quoted for forward contracts than for spot contracts. The result was that, when the fall in prices set in during the latter part of 1920 and the early part of 1921, the farmers who had made forward contracts raised questions of hardship, and the Federation considered they ought to make rebates to those who had purchased at the higher price for forward delivery. They made the rebates out of the surplus of the equalization fund. This was done with the full assent of the members, and the defendant Company collected about £2600 as rebate for their customers. These rebates had been brought into account, and there was a question connected with this. Another question concerned the storage expense of sulphate, which the Federation said was properly incurred by them. For instance, the Spanish market was rather difficult to handle; and they considered the best course was to export sulphate and store it. As higher prices were realized, the cost of storage had to be set off. When the home product was dealt with, it was found impossible to put it on the market all at once; and it was arranged that some of the makers should store it for a time and be paid a certain amount for so doing. In addition to this, there was certain German sulphate to be dealt with; and what the Federation did was done with the full assent of all. They were merely selling agents to procure the best possible price. That being the state of affairs, the scheme was prepared, and came into operation from June 1, 1920, till May 30, 1921. The question in dispute was—first, the meaning of the agreement of equalization, and, secondly, the effect of the assent by people to what was actually done by the Federation. The South Metropolitan Gas Company had received very large sums of money, and, on any view of the agreement, they would have to pay a substantial amount. The Court, however, would not be troubled with the question of figures, as the action was merely brought to obtain a declaration.

Sir JOHN SIMON said he had a different opinion as to what the result would be, though he agreed with his learned friend that the Court would not be troubled with the figures.

Mr. WRIGHT said that his accountants held the view that there had been an overpayment. The Federation was formed just on the eve of the 1920-21 scheme's coming into operation, and so the defendant Company did not become members till May, 1920. They were only members for three quarters of the year, and there might be some question as to whether the earlier scheme was in operation. At the time the defendant Company joined the Federation they had a considerable amount of sulphate which had accumulated. Counsel then called attention in detail to the various provisions in the equalization scheme, and read the correspondence which had passed between the parties.

At the rising of the Court, Mr. Wright had not concluded his opening.

His LORDSHIP suggested that it might perhaps be advantageous if the parties had a consultation with Counsel.

Mr. WRIGHT said an endeavour had already been made to come to an arrangement, but unfortunately without success. He thought if his Lordship heard the case, and decided the matter of principle, the question at issue with regard to amount could be referred to some other tribunal.

Sir JOHN SIMON said he had not had the advantage of consulting with his learned friends; but if his Lordship would grant a short adjournment, he would see what could be done in the matter.

On this understanding, the further hearing was adjourned until Monday, Nov 12.

Mantle Agent's Failure.

At the London Bankruptcy Court on Oct. 19 an application was made for the discharge of Walter Lowen, No. 36, Aldersgate Street, E.C. The Official Receiver reported that the Receiving Order was made in February last, and the liabilities amounted to £1142. The assets were estimated to produce £91. Debtor was born in Germany and came to this country in 1881; being naturalized ten years afterwards. From 1886 till 1914 he carried on business as a manufacturers' agent, under the style of Walter Lowen & Co., at No. 36, Aldersgate Street; but upon the outbreak of war, the business was closed. He attributed his insolvency to liability under judgment in respect of German debts contracted prior to 1914 and also to his liability as surety. From 1895 until 1914 he represented the German firm of F. W. & W. C. Killing, gas-mantle manufacturers, of Westphalia. In 1911 they wanted to manufacture electric light bulbs as well as gas-mantles, and asked him to find out whether the particular bulb they wished to make was patented. He made inquiries and told them that the lamp did not infringe any patent in this country. They thereupon commenced to make bulbs, and he sold them in this country in his own name. Subsequently Messrs. Killing informed him that they could not supply any more bulbs, as they infringed a patent. He then owed them about £1100 for bulbs supplied. He arranged that the £1100 should be treated as a suspense account and should be liquidated out of future profits. Upon the outbreak of war this amount had been reduced to £585, and in August, 1921, the Controller of Enemy Debts informed him that he was liable for £585 principal and £207 interest, for which amount he afterwards obtained judgment against the debtor. Eventually, the Registrar suspended the discharge for the nominal period of three weeks.

Gas-Works Deficit at Grangemouth.—A deficit of £8000 on the Grangemouth gas undertaking has been reduced to £3800 by the imposition of a contingency rate of 5d. in the pound on owners and occupiers—whether they use gas or not. A proposal to reduce this rate to 2d. was defeated, in order to attempt to clear off the whole of the remaining deficiency during the present financial year.

Gassed in a Benzole Works.—At the National Benzole Company's Cardiff works last week, three men were overcome by fumes, and Harold Mann unhappily succumbed. It appears that Mann entered a tank for the purpose of cleaning it out. He was overcome by the fumes; and the other two men, after seeking assistance, went to his rescue. They also were immediately overcome. At great risk, William Lees, an employee of another firm, entered the tank and succeeded in recovering the body of Mann, while later he brought out the other two men. Mr. D. Roberts, Depôt Manager of the National Benzole Company, also entered the tank, but had to leave owing to the fumes.

MISCELLANEOUS NEWS.

STANDARD GAS PRICES IN LONDON.

County Council and Amending Orders.

The Public Control Committee of the London County Council, in a report submitted at yesterday's meeting, recalled the fact that the Council on July 3 last agreed to make application to the Board of Trade under section 1 (3) of the Gas Regulation Act, 1920, for an Order reducing the standard price applicable to the Gas Light and Coke Company. The Committee said that, as pointed out in their report on that date, the dividends payable by gas companies are regulated by a sliding-scale under which an increase in the rate of dividend which may be distributed to shareholders must be accompanied by a reduction in the price of gas. The Gas Acts provide for the fixing of what is termed a standard price at such a point as will allow, in normal conditions, of a standard dividend. The Gas Regulation Act, 1920, authorizes the Board of Trade to make Orders from time to time varying the standard price, having regard to the variations in the cost of production. The Board of Trade have fixed Wednesday, Nov. 14, as the date of the inquiry, at the Institution of Civil Engineers, Great George Street, at 11 a.m.

The Committee, in a reference to the Commercial Gas Company, went on to remind the Council that they reported on April 24 last that they had retained the services of an expert, Mr. Arthur Valon, M.Inst.C.E., (i) to advise generally whether, upon the information at present available, there was a *primâ facie* case for applying to the Board of Trade for a revision of the standard prices charged for gas by the various Companies supplying in the London area, and, if so, then (ii) to assist in the preparation of the case should the Council decide to proceed in the matter. They had since had before them Mr. Valon's report with regard to the case of the Commercial Gas Company. From the figures submitted to them, they were satisfied that, in view of the fall in costs since the Board of Trade in 1921 fixed the present standard price of 15·4d. per therm, there was a strong case for a substantial reduction. The figures submitted to them in support of the case for reduction were of a technical nature, and no useful purpose would appear to be served by including them in their report. A copy of Mr. Valon's report would, however, be laid upon the table. In the event of a reduction in the standard price, the immediate effect upon the consumer would, perhaps, be slight, inasmuch as the Company had on several occasions since 1921 reduced the price of their gas, and were now charging 9·6d. per therm, as against 15d. per therm in 1921. At the same time, the interim dividend declared on the 4 p.ct. stock (the principal stock of the Company) for the half-year to June 30, 1923, was at the rate of 6 p.ct. per annum, though, under the existing sliding-scale arrangements, a dividend at the rate of £7 17s. 4d. per annum could have been declared, provided that the financial position of the Company permitted.

No. 3 of the Gas (Amending Orders) Rules, 1923, required that 28 days' notice of an intended application to the Board of Trade should be given to a company and to all the local authorities in a company's area of supply. The notices required by this rule would be given forthwith, if the Council agreed to the Committee's recommendation: "That application be made to the Board of Trade, under section 1 (3) of the Gas Regulation Act, 1920, for an Order reducing the standard price applicable to the Commercial Gas Company."

GAS REGULATION ACT APPLICATIONS.

The following further notices have appeared in the "London Gazette" with regard to applications to the Board of Trade for Orders under the Gas Regulation Act.

Teignmouth Urban District Council.

The maximum price now authorized in respect of the supply of gas by the undertakers is 4s. 6d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 6d. per therm.

It is also proposed that an additional charge of 3·6d. per therm should be authorized in respect of gas supplied through prepayment meters.

Ware Gas Light and Coal and Coke Company, Ltd.

The standard price now authorized in respect of the supply of gas by the undertakers is 4s. 9d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 6d. per therm.

DECLARATIONS OF CALORIFIC VALUE.

Bakewell Urban District Council.—500 B.Th.U. (Nov. 19.)

Newtown and Llanllwchaiarn Urban District Council.—430 B Th.U. (Nov. 1.)

GAS REGULATION ACT ORDERS.

We have received from the Director of Gas Administration copies of the following further Orders made by the Board of Trade under section 1 of the Gas Regulation Act.

Hamilton Corporation.

The Order empowers the Corporation to make extra charges for prepayment meter supplies. (Oct. 27.)

Newtown and Llanllwchaiarn Urban District Council.

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 18d. per therm. (Oct. 26.)

GAS REGULATION ACT AMENDING ORDER.

The Board of Trade give notice that the Corporation of Newcastle-upon-Tyne have made application under sub-section (3) of section 1 of the Act for an Amending Order revising the powers of charging authorized by the Newcastle-upon-Tyne and Gateshead Gas (Charges) Order, 1921, whereby it is desired that the following standard and maximum prices may be prescribed:

In Newcastle-upon-Tyne and Gateshead—

Standard price	11·0d. per therm.
Maximum price	12·4d. " "

In the outer areas of supply—

Maximum price	14·0d. per therm.

Any person affected desiring to make representations with regard to the application may do so by letter, addressed to the Director of Gas Administration, Board of Trade, Great George Street, S.W. 1, not later than Nov. 14, 1923.

A copy of such representations must at the same time be sent to the Town Clerk, Newcastle-upon-Tyne, and to the Secretary, Newcastle-upon-Tyne and Gateshead Gas Company.

THE LIGHTING OF BUILDINGS.

Advantageous Application of Science in the Use of Gas.

Discussing the subject of "The Lighting of Buildings," at a large gathering of students and members of the Architectural Department of the Northern Polytechnic, London, Mr. LAWRENCE M. TYE reviewed illuminating progress, and showed how it could be advantageously applied to everyday requirements.

He said the first real steps forward in modern illuminants were as recent as 1883, when Auer Von Welsbach introduced the incandescent gas-mantle, and about 1879, when Swan and Edison produced their first electric glow lamps. The introduction of such advances in illuminants, and subsequent development, led to such increase in the use of artificial light that installations were made ahead of illuminating engineering progress, with the result that one saw to-day hundreds of inefficient and badly-designed schemes. The lecturer dealt with the various sources of light which were available to the architect. The advantages and limitations of each were fully explained, as also were the various methods of wiring suitable for house work and public buildings.

After having considered different means of obtaining the source of illuminant, which were brought forward primarily for circumstances where town facilities were not available, Mr. Tye dealt with the principles underlying scientific or correct lighting. This explanation opened with a few of the definitions associated with illuminating engineering work, and was followed by an interesting model showing the operation of the inverse square and cosine laws, so far as they apply to lighting calculations. The bare light-source was next explained, and it was shown how small a quantity of the total light available actually reached the working or reading plane direct, and how the remainder depended upon the reflective power of both walls and ceiling, which in many instances was surprisingly low.

Mr. Tye then referred to the various types of illuminating glassware available, showing that, while opalescent glassware gave satisfactory results as regarded diffusion, it compared unfavourably with prismatic glass in the way of definite control of the light, and also in the matter of efficiency, which point was made clear by actual photometric curves. A comparison was made between direct, semi-indirect, and indirect lighting, showing that, considered from the aspect of efficiency, direct lighting came first, semi-indirect required approximately 50 p.ct. more energy to get the same illumination intensity on the working plane, and indirect lighting needed approximately 100 p.ct. more energy, given similar reflective co-efficients for walls and ceilings in each case. The method of plotting illumination curves was also shown, and various data were given as to the correct planning of lighting installations.

Dealing with shop window lighting, the lecturer gave an example of a window with elaborate fittings but glaring and visible light-sources, in contrast with a similar window with cheaper equipment and concealed reflectors, which made an outstanding feature of such lighting effects. Various slides showed the effect of artificial lighting on subjects of architectural interest, and also how, in numerous instances, public buildings and places of architectural merit had been sadly neglected in the provision of artificial lighting. Church lighting was dealt with, showing the planning of points advocated by illuminating engineers; and an example of concealed chancel lighting was given The lecturer further dealt with factory and flood lighting, and reviewed the progress in gas lighting, indicating how science could be applied to gas with highly advantageous results.

At the conclusion, a portable photometer—the "Holophane Lumeter"—was exhibited, and actual tests were taken of the illumination intensities in the lecture-room. This was done to prove that it was possible, not only for the architect to pre-determine by scientific calculations what his lighting intensity should be, but to record photometrically actual results. Mr. Tye invited closer co-operation between the architect and the illuminating engineer, by the combination of both, for it was possible to secure effects which were correct architecturally and satisfactory from the utilitarian aspect.

Hemel Hempstead Gas Capital Issue.—The tenders sent in to Messrs. A. & W. Richards for the 6 p.ct. preference capital in the Hemel Hempstead District Gas Company ranged from £105 down to the minimum of par; the stock being allotted at an average price of £100 17s. 10d. p.ct.

Capital Issue at Bournemouth.—The recent issue of 3500 6 p.ct. preference shares of £10 each by the Bournemouth Gas and Water Company was largely over-subscribed, and allotments were made at prices ranging from £12 to £11 5s. per share, or an average price of £11 6s. 10d. per share.

BRITISH EMPIRE EXHIBITION (1924).

A Colossal Undertaking.

April, 1924, is still some way ahead—but none too far to allow of the due completion of the huge enterprise now well advanced at Wembley Park. At any rate, so it seemed to the writer when, some days ago, he visited Wembley, with a party of some thirty members of the Technical Circle of the Institute of Journalists, to see the progress that is being made with the erection of the buildings and the laying-out of the grounds. The visit was by invitation of the Board of the British Empire Exhibition; and the party (under the leadership of Mr. Leon Gaster, the Hon. Secretary) were met on arrival by Mr. Clynes (Reception Officer), Mr. Lawrence (of the Publicity Staff), and others, who acted as guides.

Walking through the avenue from the north-west entrance (adjoining Wembley Park Station) to the Empire Stadium at the other end of the grounds, "bigness" is everywhere discernible; and great size is necessary for a display which it is intended shall "be a comprehensive survey of the achievement in art, science, and industry of the most marvellous generation that man has passed on this planet." All the Dominions and Colonies that make-up the British Empire will be represented at the exhibition, of which His Majesty the King is Patron and H.R.H. the Prince of Wales President. The Dominions and Colonies are spending over £1,000,000 on their buildings alone; and in each case the exhibits will be thoroughly characteristic of the countries they represent.

It can well be believed that never before has an exhibition on such vast lines been planned. The grounds cover an area of some 240 acres; and over £10,000,000 will have been spent on preparations before the gates are actually opened early in April—to close again in October. There will, it is said, be comfortable transport facilities and accommodation for up to half-a-million visitors a day. The exhibition buildings are almost entirely of concrete. They consist of pavilions, conference halls, a stadium, a Palace of Art, and two huge industrial halls—the Palace of Engineering and the Palace of Industry. It is in the Palace of Industry that gas will find its place. The Palace of Engineering alone covers an area of more than 11 acres, and is perhaps the largest concrete building in the world. Five lines of railway run through it from end to end, in order to facilitate the assembling of exhibits. Several of the main buildings are now rapidly approaching completion.

It is officially stated by the British Engineers' Association that considerably more than 300 of the leading engineering and shipbuilding firms of Great Britain are now pushing forward their arrangements for a joint demonstration of efficiency in the Palace of Engineering. The general organizing of the arrangements for the industries of shipbuilding, marine, mechanical, and general engineering is being carried out by the British Engineers' Association. Describing this section, Mr. D. A. Bremner, O.B.E. (Director of the Association), says it may be asserted without fear of contradiction that it will contain the finest collection of engineering plant and machinery and materials ever assembled under one roof. All the well-known firms will be there, and they are vying with one another in making their exhibits worthy of their reputation. They will afford demonstrations of the high quality of British workmanship, and examples of technical and scientific progress. Many new inventions and improvements in every direction will be displayed. A large proportion of the stands will have working exhibits. Electricity, gas, steam, and oil will all be in use as power generators for these. There will be exhibits weighing 150 tons each, and the most delicate testing instruments yet made. It will be of interest to the many hundreds who will be personally associated with the work of the various firms to know that a very fine Engineering Club is to be erected by the Association.

So great is the area covered that there will be 15 miles of roads in the exhibition, and therefore special transport facilities have had to be provided inside the grounds. There will be three kinds of mechanical transport available—a "never-stop" railway (the first to be installed in this country on more than an experimental scale), a road-rail system, and a fleet of electric cars. The "never-stop" railway (which is the invention of Mr. Yorath Lewis) is run on the principle of the underground railway escalators, and does away with drivers, conductors, and brakes; the speed varying from practically zero at the stations up to 24 miles an hour in the open. Driving power is transmitted by a continuously revolving electrically driven spiral between the rails, like the thread of a screw, which is in contact all the time with a roller arm under the cars. At the stations the spiral is closely wound; between the stations it is widely wound. Thus the speed of the cars is automatically regulated. It will be possible to carry 20,000 passengers an hour each way; and the round trip of roughly 3 miles will be accomplished in about ten minutes. With the road-rail system, there will be complete connection between the two main entrances to the exhibition and the two main railway stations to London. This system (over which there will be a frequent service, with convenient stopping places) is a development of the light railway that has not previously been seen in England; and it is claimed to solve a problem which has confronted railway engineers for many years—namely, to obtain the maximum pulling force of the engine or tractor, while keeping at a minimum the resistance of the load. This is done by providing the engine with special rubber-shod driving wheels, which run, either inside or outside the ordinary railway track, on wheelways of concrete, macadam, or other suitable material with a road-like surface. The rubber tyres adhere easily to the track, and this intensified grip enables the road-rail tractor, weight for weight, to deal with more than four times the ordinary load. The ballasting of rails, too, becomes unnecessary, and constructional costs are very much less in consequence. The road-rail track will cover about 2½ miles on the double journey.

Though the main purpose of the exhibition is serious, the amusements side will not be overlooked; for a gigantic Amusements Park is being laid out. The grounds are being prepared with all the skill of the modern garden artist. Large numbers of fine old trees have been preserved by transplanting, and an excellent show is being arranged in the various horticultural sections. When the exhibition opens, visitors are promised practically a continuous train and omnibus service.

ATTRACTIVE GAS INVESTMENTS.

[From the "Financial Times," Oct. 29.]

In view of the sound basis on which the gas industry is now established, it is worth while calling attention to the merits of gas securities. With regard to the leading undertakings, the financial policy of the managements is invariably conservative, and in many cases the position of the ordinary stocks and shares is such as to render them investments of a distinctly attractive character. Much more so is this the case with the prior issues; and in the following table we submit a list of preference and debenture stocks which give good yields and should appeal to the most cautious investor:

Security.	Rate per Cent.	Interest Due.	Price.	Yield per Cent.
Aldershot Preference	4	Feb. and Sept.	72½	5½
Bournemouth Preference	6	Feb. and Aug.	11	5½
Brentford Preference	5	March 1 and Sept. 1	92½	5½
Cape Town and District Preference	4½	May 1 and Nov. 1	6½	6½
Gas Light and Coke Preference	4	March 1 and Sept. 1	81½	4½
Liverpool Preference	7	March and Sept.	106	6½
Maidstone Perpetual Debenture Stock	3	Jan. 1 and July 1	57½	5½
Newcastle and Gateshead Preference	4	Feb. and Aug.	74½	5½
Southampton Perpetual Debenture stock	4	Jan. 1 and July 1	77½	5½
Wandsworth Debenture stock	3	Jan. 1 and July 1	58½	5½

It is true that the market in issues of the kind is not a particularly free one, most of them being very firmly held; but a certain amount of business is generally in progress, and would-be purchasers should not find a great deal of difficulty in getting their requirements met. With one exception, the securities named are of a permanent character; but purchasers of Liverpool Gas 7 p.ct. preference stock must make some provision for loss on redemption. Under the terms of issue the stock is repayable at par on June 30, 1941; but the Company retain the right to redeem it ten years earlier, or any time after, on giving six months' notice.

TRADE NOTES.

New Gas Catalogues.

The Wholesale Fittings Company, Ltd., have forwarded their latest gas lists for the season 1923-24. Both catalogues have been prepared with great care, and are well-finished descriptions of well-finished goods. It will be remembered that this firm manufacture the "Thermecon" flueless radiator fitted with special Vitreosil tubes. This gas-heater gives a cheerful heat from both sides; and the running costs approximate to a penny an hour.

Carbonization in Vertical Retorts.

A new volume has reached us bearing the title "The Woodall-Duckham System of Continuous Carbonization in Vertical Retorts." It is a publication of merit and is full of interest for the gas engineer, containing as it does sections dealing with the history of carbonization in vertical retorts, the Woodall-Duckham system, waste-heat boilers, results from typical plants, plans of installations, refractory materials, &c. The plates illustrating installations of Woodall-Duckham retorts are excellent; and the effect of the entire publication is to impress on the mind the well earned success which has met the Company's engineering skill and rightly applied scientific knowledge.

A Smokeless City.

A captivating story was told to the Lincoln Rotary Club by Mr. W. H. Mainwaring, the Manager of the Corporation Gas Department, when he read a paper on "A Smokeless City, and What It Implies." He pointed out the necessity of smoke prevention, and said that the proposals which were at present under consideration did not deal with domestic smoke at all, and yet it had been proved that this was much more mischievous and offensive than industrial smoke. So far as volume alone was concerned, approximately five times as much smoke was caused in this country by household chimneys as by industrial operations; and while the amount of carbon, &c., in factory smoke was on an average no more than ½ p.ct., the proportion in domestic smoke got as high as 6 p.ct. Further, by reason of its larger percentage of tar, it adhered to every object upon which it fell, and was therefore more obnoxious and destructive. The damage caused by soot and coal residuals was calculated at £2 per head of the population, and from three-quarters to four-fifths was due to domestic smoke. As to the remedy for this state of affairs, he expressed his pride in reflecting upon the important part which had been played by the industry with which he was connected in alleviating the smoke evil, and said he hoped to see even better results in the future. In fact, he considered that they would succeed, before many years had passed, in reducing the nuisance from domestic smoke to an insignificant amount. His contention was that people had no more right to poison the air which was breathed by their neighbours than to pollute the water which these neighbours drank. At its close, Mr. Mainwaring was thanked for his paper.

Disposal of Gas Profits at Keighley.—A proposition which is likely to raise controversy in the Keighley Town Council is a resolution to be introduced by Alderman J. W. Midgley, requesting the Gas Committee to contribute to the Keighley Hospital Bazaar Fund £1000 from the profits of the gas undertaking, and that this sum be taken from the amount that was, or is, intended to be placed to reserve fund.

HALIFAX NEW SCALE OF CHARGES.

Details were given on p. 271 of the "JOURNAL" for Oct. 24 of the new "standard requirement" scheme, by which, as from the meter readings in March, 1924, consumers of gas at Halifax may be supplied in accordance with a scale of prices fixed by the Corporation as an alternative to the present "standard requirement" scheme. Mr. W. B. M'Lusky (the Engineer and Manager) has since forwarded the following tables in connection with this new scheme, which will be of interest in conjunction with the particulars already published.

It will be observed that if the consumer at present is charged the non-lighting rate for all gas "*used in excess of the standard requirement*," he would need to consume more than 25,000 c.ft. of gas to benefit by the new scheme. If he is at present charged the non-lighting rate for *all gas used*, he would need to consume more than 28,000 c.ft. per annum to benefit by the new scheme. The figures refer to a consumer whose "standard requirement" of gas per annum is 9000 c.ft.

New Scale of Gas Charges, as from the Meter Readings in March, 1924.

Amount of Standard Requirement per Annum.	Fixed Charge. Per Week.	Per Quarter.	Per Annum.	Minimum Consumption of Gas to Benefit by New Scale. Present Standard Requirement Scale.	Present Non-Lighting Scale.
C.Ft.	s. d.	s. d.	s. d.	C.Ft.	C.Ft.
9,000 or less	0 9	9 9	39 0	25,000	28,000
10,000	0 10	10 10	43 4	27,000	31,000
11,000	0 11	11 11	47 8	30,000	34,000
12,000	1 0	13 0	52 0	33,000	37,000
13,000	1 1	14 1	56 4	35,000	40,000
14,000	1 2	15 2	60 8	38,000	43,000
15,000	1 3	16 3	65 0	41,000	46,000
16,000	1 4	17 4	69 4	44,000	49,000
17,000	1 5	18 5	73 8	46,000	52,000
18,000	1 6	19 6	78 0	49,000	55,000
19,000	1 7	20 7	82 4	52,000	58,000
20,000	1 8	21 8	86 8	54,000	61,000
21,000	1 9	22 9	91 0	57,000	64,000
22,000	1 10	23 10	95 4	60,000	67,000
23,000	1 11	24 11	99 8	62,000	70,000
24,000	2 0	26 0	104 0	65,000	73,000
25,000	2 1	27 1	108 4	68,000	77,000
26,000	2 2	28 2	112 8	70,000	80,000
27,000	2 3	29 3	117 0	73,000	83,000
28,000	2 4	30 4	121 4	76,000	86,000
29,000	2 5	31 5	125 8	79,000	89,000
30,000	2 6	32 6	130 0	81,000	92,000
31,000	2 7	33 7	134 4	84,000	95,000
32,000	2 8	34 8	138 8	87,000	98,000
33,000	2 9	35 9	143 0	89,000	101,000
34,000	2 10	36 10	147 4	92,000	104,000
35,000	2 11	37 11	151 8	95,000	107,000
36,000	3 0	39 0	156 0	98,000	110,000
37,000	3 1	40 1	160 4	100,000	113,000
38,000	3 2	41 2	164 8	103,000	116,000
39,000	3 3	42 3	169 0	106,000	119,000
40,000	3 4	43 4	173 4	108,000	122,000
41,000	3 5	44 5	177 8	111,000	125,000
42,000	3 6	45 6	182 0	114,000	128,000
43,000	3 7	46 7	186 4	116,000	132,000
44,000	3 8	47 8	190 8	119,000	135,000
45,000	3 9	48 9	195 0	122,000	138,000
46,000	3 10	49 10	199 4	125,000	141,000
47,000	3 11	50 11	203 8	127,000	144,000
48,000	4 0	52 0	208 0	130,000	117,000
49,000	4 1	53 1	212 4	133,000	150,000
50,000	4 2	54 2	216 8	135,000	153,000
51,000	4 3	55 3	221 0	138,000	156,000
52,000	4 4	56 4	225 4	141,000	159,000
53,000	4 5	57 5	229 8	144,000	162,000
54,000	4 6	58 6	234 0	146,000	165,000
55,000	4 7	59 7	238 4	149,000	168,000
56,000	4 8	60 8	242 8	152,000	171,000
57,000	4 9	61 9	247 0	154,000	174,000
58,000	4 10	62 10	251 4	157,000	177,000
59,000	4 11	63 11	255 8	160,000	180,000
60,000	5 0	65 0	260 0	162,000	184,000

Price of Gas.

1000 C.Ft	At 3s. 11d. per 1000 C.Ft. £ s. d.	At 3s. 5d. per 1000 C.Ft. £ s. d.	At 2s. per 1000 C.Ft. £ s. d.
1	0 3 11	0 3 5	0 2 0
2	0 7 10	0 6 10	0 4 0
3	0 11 9	0 10 3	0 6 0
4	0 15 8	0 13 8	0 8 0
5	0 19 7	0 17 1	0 10 0
6	1 3 6	1 0 6	0 12 0
7	1 7 5	1 3 11	0 14 0
8	1 11 4	1 7 4	0 16 0
9	1 15 3	1 10 9	0 18 0
10	1 19 2	1 14 2	1 0 0
11	2 3 1	1 17 7	1 2 0
12	2 7 0	2 1 0	1 4 0
13	2 10 11	2 4 5	1 6 0
14	2 14 10	2 7 10	1 8 0
15	2 18 9	2 11 3	1 10 0
16	3 2 8	2 14 8	1 12 0
17	3 6 7	2 18 1	1 14 0
18	3 10 6	3 1 6	1 16 0
19	3 14 5	3 4 11	1 18 0
20	3 18 4	3 8 4	2 0 0
21	4 2 3	3 11 9	2 2 0
22	4 6 2	3 15 2	2 4 0
23	4 10 1	3 18 7	2 6 0
24	4 14 0	4 2 0	2 8 0
25	4 17 11	4 5 5	2 10 0
26	5 1 10	4 8 10	2 12 0
27	5 5 9	4 12 3	2 14 0
28	5 9 8	4 15 8	2 16 0
29	5 13 7	4 19 1	2 18 0
30	5 17 6	5 2 6	3 0 0
31	6 1 5	5 5 11	3 2 0
32	6 5 4	5 9 4	3 4 0
33	6 9 3	5 12 9	3 6 0
34	6 13 2	5 16 2	3 8 0
35	6 17 1	5 19 7	3 10 0
36	7 1 0	6 3 0	3 12 0
37	7 4 11	6 6 5	3 14 0
38	7 8 10	6 9 10	3 16 0
39	7 12 9	6 13 3	3 18 0
40	7 16 8	6 16 8	4 0 0
41	8 0 7	7 0 1	4 2 0
42	8 4 6	7 3 6	4 4 0
43	8 8 5	7 6 11	4 6 0
44	8 12 4	7 10 4	4 8 0
45	8 16 3	7 13 9	4 10 0
46	9 0 2	7 17 2	4 12 0
47	9 4 1	8 0 7	4 14 0
48	9 8 0	8 4 0	4 16 0
49	9 11 11	8 7 5	4 18 0
50	9 15 10	8 10 10	5 0 0
60	11 15 0	10 5 0	6 0 0
70	13 14 2	11 19 2	7 0 0
80	15 13 4	13 13 4	8 0 0
90	17 12 6	15 7 6	9 0 0
100	19 11 8	17 1 8	10 0 0
250	48 19 2	42 14 2	25 0 0
500	97 18 4	85 8 4	50 0 0
750	146 17 6	128 2 6	75 0 0
1000	195 16 8	170 16 8	100 0 0

Norwich Engineering Society.

Though there are several associations connected with engineering in Norwich so far as trades are concerned, there was not, until last week, one that included members connected with the various branches of engineering that was not a trade association. This state of affairs has now been remedied, and at a meeting of upwards of sixty engineers in the city on Monday, Oct. 29, it was unanimously decided to form such an organization, on the motion of Mr. A. E. Collins (the City Engineer), seconded by Mr. Thomas Glover (Engineer and Manager of the Norwich Gas-Works). In supporting the proposition, Mr. F. M. Long (the City Electrical Engineer) said the formation of the Society would be an important development, because Norwich was becoming more and more an engineering centre. Many new firms had sprung up in the last few years, and the tendency was for them to increase. It was important, especially for the rising generation of engineers, that there should be such a Society. It would be open to any interested, so long as they were connected with engineering, and it should be their object to encourage the students to participate in the business, and to hold their own meetings. The Norwich Engineering Society—as the Association will be called—then elected officers as follows: President, Mr. A. E. Collins; Vice-Presidents, Mr. F. M. Long and Mr. W. H. Scott; Hon. Treasurer, Mr. C. J. Jewell; Hon. Secretary, Mr. R. A. Lower; Council, Messrs. Thomas Glover, J. B. Willis, T. Lakey, G. E. Ffiske, W. Le Neve Bower, G. Egles, A. R. Pank, J. D. North, and F. W. Doggett; Auditors, Messrs. V. E. Harston and G. T. Redgment.

Ancient Gas Records at Lancaster.—The Engineer reported to the Lancaster Corporation that he had found a large number of ancient deeds and other documents relating to the old Lancaster Gas Company, and suggested that among them might be found some of interest to the Lancaster Museum. A Sub-Committee were requested to inspect the documents and report.

Advertising for a Gas Manager.

There was a long discussion at a meeting of the Blackpool Town Council on the 31st ult. regarding a recommendation of the Gas Committee that applications be invited by advertisement for the vacant position of gas engineer and manager, at a salary of £800 per annum. Mr. Howe said that in Mr. Chew (the Acting Manager) they had a good man. There was a resolution on the books that all vacant positions should be advertised; and the best way out of the difficulty would be to refer the matter to the General Purposes Committee. He moved that this course be taken. Mr. Tomlinson, seconding, said it was absurd to advertise the position when the Gas Committee were satisfied that Mr. Chew was capable of carrying on the work. Alderman Heap also described the proposal as a farce, adding that they were inviting men from all over the country to apply for a position which it was almost certain that Mr. Chew would obtain. Mr. Newman said they had 80 applicants for the assistant managership when the salary was £400 per annum. Quite half that number were capable of taking the position of manager. It was unfair and unjust to hand the position down for generations without giving others the chance to apply. Mr. Boden said that, as a public body, they should not advertise positions when one man had been practically decided upon. The advertising of positions was adopted by almost every corporate body; and all should be given a chance. Mr. Monk said that the Gas Committee had not decided to appoint Mr. Chew. They must advertise for a manager; and if Mr. Chew was found the best, he would give him his vote. The resolution was carried, and the matter was referred to the General Purposes Committee for discussion. The Town Clerk said there was no previous decision to fill all vacancies by advertising.

Northern Smokeless Fuels, Ltd., has been registered as a private company, with a capital of £2000, to carry on business as manufacturers of, and dealers in, briquettes and patent fuels in the United Kingdom, Europe, or elsewhere.

THE NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

As far as gas coal is concerned, there is not much change to report in the situation. The feature of the week has rather been the strength of steams. There is a big demand for these from Germany, where stocks for railway purposes are extremely low. Much must, of course, depend upon what can be arranged as regards payment; but the discussions during the week as to the financing from this country of coal shipments to Germany have given considerable impetus to the steam-coal market, both for Northumberlands and Durhams.

This has been reflected in the Newcastle market generally, and the firm tone has been maintained in spite of the difficulty of fixing up export business at present prices. The demand for gas coal still seems to hang fire; but collieries have enough business in their books and optimism as to the future to maintain quotations. Contractors are taking out their quantities fairly regularly; but bad weather has caused a certain amount of trouble through late arrival of boats, so that one or two collieries have offered at slightly reduced rates odd cargoes for prompt shipment. The quotations for specials and best qualities remain steady at 24s. and seconds are 22s. 6d. to 23s. f.o.b. Business for next year is, however, very difficult to place at these figures.

American competition is being felt strongly in the Italian market, and several cargoes are said to have been placed there during the past week at c.i.f. prices with which English merchants cannot compete at all at current f.o.b. quotations.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From a Local Correspondent.

The mild weather is retarding the house-coal deliveries in Yorkshire and Lancashire, and the requests of the public are on the small side, both for best and secondary qualities. Collieries, however, report full working hours; and supplies, though moving forward slowly, are enabling the pits to work satisfactorily. There appears to be no improvement in the industrial outlook, owing to the European situation.

Shipping[illegible]es are firm, with no alteration during the last few weeks. Furnace coke has declined in value.

Gas-coal consumers are quiet, as their arrangements are practically made for delivery up to the end of March and onwards. Spot lots are scarce, although there is a little demand from abroad for this description of fuel.

Judging by present appearances, it would seem that, given a normal state of affairs, with a settlement of the Ruhr and a consequent increase in the demand from our own industries, there will be a considerable shortage of fuel within a year or two. It is impossible to see into the future beyond two or three months; and whether the British consumers will be able to pay increased prices for their requirements, is problematical.

There has been during the past few weeks a scarcity of wagons in various local centres. This is possibly accounted for by the fact that the recent congestion at the nearer shipping ports has held up many trucks which would otherwise have been available.

COAL TRADE IN THE MIDLANDS.

From our Local Correspondent.

Supplies are plentiful. Spot lots of gas coal are offered at prices well below contract level; but good qualities are not over-abundant, and generally command a satisfactory market. Best household coals are not selling very readily; and this causes a temporary weakness as regards the output of some of the pits. The potential demand is there, of course, and it will become effective with the first touch of hard weather; but meanwhile stocks are renewed only slowly, and outlets have to be sought elsewhere. With few exceptions the collieries of the Midlands are working regularly; while there are occasional dislocations through shortage of wagons, the transport service is operating more smoothly than it was a short time ago. A considerable movement of beans and D.S. nuts is reported. Anxiety has been relieved with reference to slacks, a sound balance having been re-established between demand and supply. The market for gas coke is quite firm. Hard furnace cokes are no cheaper, oven men having decided that, in view of the general conditions of their own industry, they would not be justified in increasing the preference they have given to the home consumer over the foreigner. There is still a strong inquiry on behalf of the export trade, though buyers on the Continent are scrutinizing prices more closely. As the result of a conference at the end of October, the home price to Midland blast-furnaces has been re-affirmed at 24s. at ovens.

Reduction Recommended at West Bromwich.—The West Bromwich Gas Committee have made a recommendation to the Town Council to decrease the price of gas by 6d. per 1000 c.ft. as from Oct. 1.

Sligo Gas-Workers' Strike.—Much inconvenience arose last week in Sligo from the cutting-off of the gas supply, owing to a strike of workers, due to a general "lightning strike" as a protest against the Free State Government's detention of political prisoners on hunger strike. All works and industries were brought to a standstill; those using gas power being specially affected. The military authorities intervened, taking over the gas-works; and every effort was made to have the lighting service resumed.

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CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Nov.* 5.

There is a good deal of inquiry for pitch in the London Market, for both forward and prompt delivery; and the price is reported to be not below 142s. 6d. net per ton in bulk *ex* maker's works. Creosote is also in demand, but supplies are scarce. Other products are without alteration.

Tar Products in the Provinces.

Nov. 5.

There is no material alteration in the market for tar products, the tone has been dull and the prices have remained the same.

The average values for gas-works products during last week were: Gas-works coal tar, 79s. to 84s. Pitch, East Coast, 135s. to 137s. 6d. f.o.b. West Coast—Manchester, 130s. to 132s. 6d.; Liverpool, 131s. to 133s. 6d.; Clyde, 132s. to 135s. Benzole 90 p.ct., North, 1s. 0½d. to 1s. 1d.; crude 65 p.ct. at 120° C., 9½d. to 10d. naked at makers' works; 50-90 p.ct., naked, North, 1s. 5d. to 1s. 7d. Toluole, naked, North, 1s. 5d. to 1s. 7d., nominal. Coal tar crude naphtha in bulk, North, 8d. to 8¼d. Solvent naphtha, naked, North, 1s. 2¼d. to 1s. 4d. Heavy naphtha, North, 1s. 5½d. to 1s. 7½d. Creosote, in bulk, North, liquid, 8d. to 8¼d.; salty, 7½d. to 8d.; Scotland, 6¾d. to 7¾d. Heavy oils, in bulk, North, 8½d. to 9d. Carbolic acid, 60 p.ct., 3s. 4d. to 3s. 5d. prompt. Naphthalene, £15 to £16; salts, £6 to £8, bags included. Anthracene, "A" quality, 4d. per minimum 40 p.ct., purely nominal; "B" unsaleable.

In their report for the month of October, Messrs. S. W. Royse & Co., Ltd., say: There is little change to report in tar products. Benzoles and toluoles remain quiet; the prospect of further reduction in the price of petrol having a weakening effect upon the market. Solvent naphtha continues without much inquiry. Creosote is in steady demand, with little offering, and prices remain firm. Supplies of crude carbolic acid are scarce, and values are steady. In naphthalenes, crude qualities are in somewhat better demand; but there is practically no change in the refined. In pitch, the position still continues difficult; but considerable business has recently been done both for export and South Wales. Sales have been reported at prices showing a big advance on recent values, and the market is steady. The Ruhr position hinders business, both makers and consumers hesitating about committing themselves until the situation is more defined. There is no change in the home trade in sulphate of ammonia, but the export demand has lessened.

Mr. Alfred Scholes, of Norton-on-Tees, has been appointed Gas Examiner to the Stockton Town Council, at a fee of one guinea per test.

Cheaper Gas at Tyldesley.—Last year Tyldesley gas undertaking made a net profit of £2967, despite a reduction in the price of gas from 7s. 6d. to 6s. 8d. per 1000 c.ft. There was a decrease of 3,804,800 c.ft. in the consumption, due to industrial and trade depression. A further reduction of 1s. 8d. has been made in the price, which is now 5s. per 1000 c.ft.

Gas Price in Horwich.—At a meeting of the Bolton Corporation Gas Committee, a letter was read from the Clerk to the Horwich Urban District Council, again making application that the price for gas supplied to consumers in Horwich should be the same as that charged to Bolton consumers, and also asking that the price for street lighting should be at least equal to the lowest charge for lighting and domestic purposes in the borough, if not the lowest charge for industrial purposes. Consideration of the matter was deferred.

Manchester Gas Committee and Works Visits.—The decision of the Gas Committee to visit the works of a firm of contractors came under discussion at a meeting of the Manchester City Council last Wednesday. Alderman Walker declared that all other committees had turned the invitation down, and that even if the firm was a local one it was well to remember that business was done nationally. The Chairman of the Gas Committee (Alderman Sir William Kay) said there was nothing novel in a committee of the Corporation visiting the works of the Company, whose undertaking was an asset to the Manchester Ship Canal, in the welfare of which the city was largely interested. While he was willing to take the subject back, he personally was prepared to visit the works without let or hindrance from any remarks of the Council. After further discussion, the minute was withdrawn, and a similar step was taken with regard to an invitation that had been accepted by the Tramways Committee.

Demand for Cheaper Gas at Stafford.—The question of gas charges was again brought forward at a meeting of the Stafford Town Council last week, when Mr. G. Owen moved to refer back the report of the Gas Committee, in order to discuss the subject, remarking that the profits of the gas department were far in excess of what a municipal undertaking ordinarily yielded. Last year there was a gross profit of £22,659, and £2600 was paid to the district fund. Mr. Billingsley agreed that the Gas Committee and the staff were doing their utmost, but thought that, instead of placing £16,000 to reserve, this sum might have been applied in reducing the price of gas. Alderman Young (Chairman of the Gas Committee) replied that the price of gas to the quarterly and slot-meter consumers was reduced about three months ago; and those who were now paying their quarterly accounts were benefiting to the extent of 6d. per 1000 c.ft. He asserted that the price of gas in Stafford was lower than the average for the whole country. Alderman Mycock said that the amount paid over from the undertaking in relief of the rates was a two years' contribution. The department had suffered through lack of working capital, and they were trying to get the depreciation and reserve fund into a healthy condition, to avoid borrowing money to run the concern. The amendment was defeated by a large majority; the report then being adopted.

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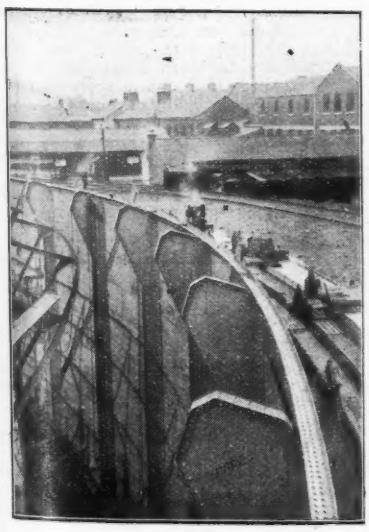
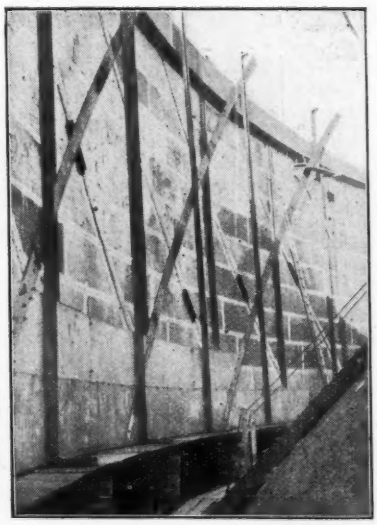
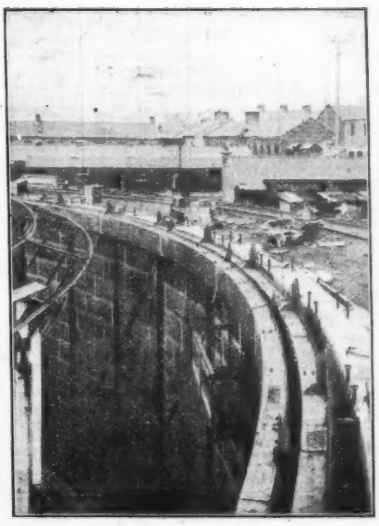

Photographs taken during erection, showing Inner Lift Stays, Footplate Sheeting and dip of third Lift, and the two outer Lifts after lowering out.

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STOCK MARKET REPORT.

THE Stock Markets began last week in an undecided manner; the announcement of the French conditions checking the hopeful feeling of the previous week. Very little business has been done on the Exchange. The success of the latest batch of new issues indicates that the public appetite for new securities is still very keen; but it is obvious, by the failure of two Loans issued on slightly less satisfactory terms, that the "yield" is a material factor. Tens of millions have been subscribed in the last week or two on slightly better terms than can be obtained by dealing direct with the Stock Exchange, and complaints are general among brokers and dealers.

Gilt-edged securities were dull on the fall in sterling exchange. Oil shares continued in favour, and some large transactions were reported; but there was a slight reaction at the end of the week. Rubber and Rand Gold shares were supported.

In the Gas Market, Maidstone 5 p.c. ordinary, which made the sensational jump of 36 points in the previous week, fell back 15 points to 125-130. Other changes were as follows: Brighton and Hove rose 1 to 175-180, British 7 p.c. preference 2 to 122-127, Cardiff 7½ p.c. debenture 2 to 108-113, and Gas Light and Coke 3 p.c. debenture ½ to 61½-64½.

The following transactions were recorded on the London Stock Exchange during the week. On Monday, Alliance and Dublin 69½, 4 p.c. debenture 66, Bombay 5% *ex* div., Bournemouth 5 p.c. 12 7/16, Brentford "A" 102½, 103, Brighton and Hove 10 p.c. 178, British 124, Commercial 95½, 96, European 8⅛, 8 5/16, 8⅜, 8 7/16, Gas Light and Coke 95½, 95⅝, 95¾, 95⅞, 96⅛, 4 p.c. consolidated preference 80½, 80⅝, 81⅛, 3 p.c. consolidated debenture 63, Hastings and St. Leonards 3½ p.c. converted, 82, 82½, Imperial Continental 155, 156½, 157, Primitiva 6s. 6d., 5 p.c. preference 27s., 28s., South Metropolitan 98, 98¼, 98⅛, 99, 5 p.c. preference 1924, 98, 3 p.c. debenture 63, 6½ p.c. debenture 1931 106, Tottenham 4 p.c. debenture 81½, 82. Supplementary prices, Gas Light 10 p.c. Bonds 195. On Tuesday, Alliance and Dublin 69, Brentford 4 p.c. "A" consolidated 103, British 7 p.c. preference 123, European 8¼, 8⅛, Gas Light and Coke 95⅛, 96, 3½ p.c. maximum 65⅝, 4 p.c. consolidated preference 80, 80½, 3 p.c. consolidated debenture 63, 64, Primitiva 4 p.c. 1st debentures 73½, South Metropolitan 98, 98⅛, 3 p.c. debenture 62½, South Suburban 101, Tottenham 3½ p.c. "B" consolidated 102½, Wandsworth 3½ p.c. "B" 120. On Wednesday, Alliance and Dublin 69, Bournemouth 5 p.c. 12 9/16, Cape Town and District 7½, European 8, 8⅛, Gas Light and Coke 95, 95¼, 95⅛, 95⅝, 95⅞, 3½ p.c. maximum 65½, 4 p.c. consolidated debenture 64, 80½, 81½, 3 p.c. consolidated preference 64, Imperial Continental 155, 155½, Montevideo 49½, South Metropolitan 98½, 98¾, 98⅞, South Suburban 5 p.c. 101. Supplementary prices, Brighton and Hove 6 p.c. "B" preference 106, Danish 4 p.c. debenture 84, Gas Light and Coke 10 p.c. Bonds 197. On Thursday the Stock Exchange was closed. On Friday, British 123, 124½, Continental Union 31, European 8⅛, Gas Light and Coke 95, 95¼, 95⅛, 95⅜, 4 p.c. consolidated preference 80, Imperial Continental 3½ p.c. debenture 77, Montevideo 50, Primitiva 5s. 6d, 5 p.c. preference 27s. 9d., South Metropolitan 98, 98¼, 98⅜, 99, Tottenham "B" 103. Supplementary prices, Brighton and Hove 6 p.c. "B" preference consolidated 107, Cardiff maximum consolidated 99⅜, Danish 4 p.c. debenture 81, Northampton 5 p.c. consolidated 85, Watford 3½ p.c. "B" consolidated 92.

The Foreign Exchange Market was dull. The value of the dollar sterling fell during the week from $4.48⅜ to $4 45⅜, and all the reparation exchanges were weaker.

With the close of the month, business was more active in Lombard Street. Easier conditions prevailed at the end of the week, and on Friday money was finally offered at 2 p.ct.

Some activity was reported in the Silver Market, and India and China were buyers. The price fell on the week, however, from 31 15/16d. to 31¾d. per oz.

The Bank of England rate remains at 4 p.ct., to which figure it was raised from 3 p.ct. on July 5.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S TRANSACTIONS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Divid. at Rate of	NAME.	Closing Prices, July 30, 1914.	Variation. Quotations, Nov. 2.	Variation. Lowest and Highest Prices of Transactions.
£			p.c.	% p.a.				
131,978	Stk.	Aug. 9	—	5	Aldershot 5 p.c. max. C.	..	72—77	...
217,992	,,	,,	4	4	Do. 4 p.c. Pref.	..	70—75	...
1,551,868	,,	Oct. 4	2½	5½	Alliance & Dublin Ord.	59—64	68—73	69—69½
374,000	,,	July 12	4	4	Do. 4 p.c. Deb.	76—79	62—67	66
280,000	5	Oct. 18	7½	8	Bombay, Ltd.	5½—6½	5⅜—5⅝	5⅜*
100,000	10	Aug. 9	16	8½	Bournemouth Gas & Pref. 6 p.c. and Water 4 p.c. Deb.	..	12 1/16—12 3/16	12 1/16—12 3/16
383,110	10	,,	7	7		15—15½	11—12	...
115,000	10	,,	6	6		13¾—14	77—82	...
162,025	—	June 28	—	4		..	100—105	102½—103
992,045	Stk.	July 12	14	6⅞	Brentford A Consolid.	262—266	100—105	...
734,920	,,	,,	11	6½	Do. B New	204—209	90—95	...
55,000	,,	,,	5	5	Do. 5 p.c. Pref.	109—111	77—82	...
221,400	,,	June 14	4	4	Do. 4 p.c. Deb.	91—93	175—180	178
214,745	,,	Aug. 23	11	11½	Brighton & Hove Orig. A Ord. Stk.	208—213	127—132	...
244,200	,,	,,	8	8½		154—159	95—96 B.	...
1,287,500	Stk.	July 26	5	5	Bristol 5 p.c. max.	..	123—128	123—124
570,000	20	Oct. 4	12½	12	British A Ord.	44—45	122—127	123
100,000	10	June 28	—	7	Do. 7 p.c. Pref.	..	75—80	...
120,000	Stk.	,,	4	4	Do. 4 p.c. Deb. Stk	88—90	7—8	7½
100,000	10	May 17	—	7	Cape Town & Dis., Ltd'	1½—2½	6—7*	...
100,000	10	Oct. 31	—	4½	Do. 4½ p.c. Pref.	4—6	75—80	...
150,000	Stk.	June 28	4½	4½	Do. 4½ p.c. Deb. Stk.	70—75	108—113	...
237,860	,,	,,	—	7½	Cardiff 7½ p.c. Deb.	..	..	...
137,150	,,	Feb. 26	5	5	Chester 5 p.c. Ord.	108—110	95—98	95¼—96
2,513,280	,,	July 26	5/9/4	6	Commercial 4 p.c. Stk.	106—108	93—98	...
360,000	,,	,,	5½	6	Do. 3½ p.c. do.	103—105	60—64	...
475,000	,,	June 14	3	3	Do. 5 p.c. Deb. Stk.	69½—71½	28—33	31
400,000	,,	14 Jan. 15	4	—	Continental Union, Ltd.	76—79	75—80	...
200,000	,,	Dec. 14	7	4	Do. 7 p.c. Pref.	115—118	102—105	...
660,000		Aug. 9	—	6½	Croydon sliding scale.	..	85—88	...
284,975		,,	—	5	Do. max. div.	..	110—112	...
498,270	Stk.	,,	6	4½	Derby Con. Stk.	123—125	74—76	...
55,000	,,	,,	4	4	Do. Deb. Stk.	102—104	..	...
209,000	,,	Oct. 4	—	5	East Hull 5 p.c. max.	..	8—9	8—8 7/16
1,002,180	,,	July 12	10	5	European, Ltd.	17½—18	95—97	95—96
16,546,120	Stk.	July 26	4/17/4	5⅛	Gas Light and Coke 4 p.c. Ord.	98—102	65—68	65½—65¾
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	76—79	80—83	80—81½
4,062,335	,,	,,	4	4	Do. 4 p.c. Con. Pref.	96—99	61½—64½	63—64
4,761,930	,,	June 14	3	3	Do. 3 p.c. Con. Deb.	72½—74½	..	195—197
150,000	,,	Dec. 11	10	10	Coke 10 p.c. Bonds	..	93—98	...
42,000	—	—	—	7½	Do. 7½ p.c. Ilford Deb.	..	78—83	82—82½
82,500	,,	Sept. 19	5	6½	Hastings & St. L. 5 p.c.	..	144—149	...
258,740	,,	,,	3½	5½	Do. 3½ p.c. Deb.	87—89	155—160	155—157
70,000	10	Oct. 18	11	10	Hongkong & China, Ltd.	16½—16¾	76—78	77
86,600	Stk.	Aug. 23	9	9½	Hornsey 7 p.c.	..	95—100	...
1,976,000	,,	May 31	9	17	Imperial Continental	150—160	..	...
401,400	,,	Aug. 9	3½	3½	Do. 3½ p.c. Deb. Red.	84—86	104—107	...
235,242	,,	,,	6½	6½	Lea Bridge Ord. 5 p.c.	119—121	125—130	...
2,127,240	,,	Feb. 26	10	5½	Liverpool 5 p.c. Ord.	..	55—60	...
600,000	,,	Sept. 19	—	7	,, 7 p.c. Pref.	..	3½—4	...
165,736	,,	Aug. 23	7/5/6	9	Maidstone 5 p.c.	..	..	...
63,480	,,	June 28	—	—	Do. 3 p.c. Deb	..	93—98	...
75,000	5	June 14	6	7	Malta & Mediterranean Met. of Melbourne 4½ p.c. Deb.	4½—4¾	49—54	49½—50
50,000	100	Oct. 1	4½	4½		99—101	85—85½N.	...
541,920	Stk.	May 17	4	4	Montevideo, Ltd.	11½—12	74½—76½N.	...
1,875,892	,,	July 26	4½	4½	Newcastle & Gatsh'dCon.	98½—99½	71—73 N.	...
250,166	,,	Aug. 9	—	4	Do. 4 p.c. Pref. Stk.	..	16½—17½	...
529,705	,,	June 28	3½	3½	Do. 3½ p.c. Deb.	82—83	11½—12½	...
15,000	10	Aug. 23	—	11	North Middlesex 10 p.c.	..	97—102	...
75,940	10	,,	7/14/0	7 7/10	,, 7 p.c.	14—15	108—113	...
300,000	Stk.	May 3	8	7	Oriental, Ltd.	117—122	100—105	...
138,120	Stk.	June 28	—	7½	Plym'th & Stonh'se 5 p.c.	..	70—74	...
60,000	50	Sept. 6	13	13	Portsea Island, B	128—131	56—59	...
100,000	50	,,	12	12	Do. C	118—121	56—59	...
1,450,345	5	29 Oct. 14	8	—	Primitiva Ord.	5½—6	5½—6	...
2,499,800	5	30 Dec. 13	5	—	Do. 5 p.c. Pref.	4½—5	56—59	...
341,400	100	June 1	4	4	Do. 4 p.c. Deb.	91—93	56—59	...
600,000	Stk.	July 26	4	4	Do. ,, ,, 1911	..	5½—6	...
220,335	,,	June 28	4	4	Do. B. Aires 4 p.c. Deb.	85—87	38—41	...
321,670	,,	,,	4	4	Do. Riv. Pl. 4 p.c. Deb.	85—87	99—101S.	...
150,000	10	Oct. 4	6	6	San Paulo 6 p.c. Pref.	10½—11	99—101S.	...
125,000	50	July 2	5	5	5 p.c. Deb.	47—49	99—101S.	...
270,000	Stk.	Aug. 23	10	5	Sheffield A	223—224	99—101S.	...
419,963	,,	,,	10	5	Do. B	222—224	..	...
1,047,000	,,	,,	10	6	Do. C	220—222	7—9*	...
133,201	Stk.	—	4	6	Shrewsbury 5 p.c.	..	98—100	98—99
90,000	10	Oct. 18	9	6	South African	10½—11½	61—64	62½—63
5,609,895	Stk.	July 26	5/9/4	5	South Met. Ord.	111—113	98—100	99
250,000	,,	July 12	3	3	Do. Red. Pref.	..	61—64	62½—63
1,895,445	,,	,,	3	3	Do. 3 p.c. Deb.	72½—74½	105—107	106
734,000	,,	Sept. 6	—	6½	Do. 6½ p.c. Deb.	..	134—136N.	...
91,500	,,	Aug. 23	8½	8½	South Shields Con. Stk.	157—159	100—103	101
1,087,795	,,	,,	6	6	S'th Suburb'n Ord. 5 p.c.	114—116	97—102	...
368,837	,,	June 28	5	5	Do. 5 p.c. Deb. Stk.	116—118	88—91	...
647,740	,,	May 3	5	7	S'th'mpt'n Ord. 5p.c. max	99—102	76—81	...
121,275	,,	June 28	4	4	Do. 4 p.c. Deb. Stk.	..	102—104	...
250,000	,,	Aug. 23	—	7	Swansea 7 p.c. Pref. Stk.	..	105—107	...
200,000	,,	June 28	—	6½	Do. 6½ p.c. Deb. Stk.	..	122—127	...
120,000	,,	July 26	—	8	Tottenham A 5 p.c.	135—138	100—105	102½—103
782,275	,,	,,	6	6½	District B 3½ p.c.	115—117	78—82	81½—82
181,855	Stk.	June 14	4	4	4 p.c. Deb.	87—89	88—90 N.	...
258,251	Stk.	Aug. 23	5	5	Tynemouth 5 p.c. max.	108½—109		
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	July 12	8½	9	Wandsworth A 5 p.c.	151—156	140—145	...
255,636	,,	,,	6½	7½	Do. B 3½ p.c.	129—134	116—121	120
108,075	,,	,,	5/17/3	6 7/10	Do. C.	110—115	100—105	...
140,865	,,	,,	—	6 7/10	New Ord nary	..	..	...
352,000	,,	,,	6½	7½	Wimbledon 5 p.c.	117—122	110—115	...
98,000	,,	,,	6½	7½	Epsom 5 p.c.	121—126	118—123	...
88,416	,,	June 28	5	5	5 p.c Deb. Stk.	66—69	57—60	...

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A Public Lighting Question.—The decision recently taken by the Warrenpoint (co. Down) Urban Council to abandon public lighting for the winter, except to a single gas-lamp in the town square, led to much adverse comment among the ratepayers; and it was ultimately decided to seek advice as to whether the Council were legally bound to have the lamps lighted. The Council's Solicitor (Mr. Rutherford) has now advised that no duty is imposed upon them in the matter, but they have a discretion. If an accident occurred through a person colliding with an unlighted lamp standard, the Council would not, in his opinion, be liable for damages, unless it could be shown by the injured person that the proximate cause of the accident was the non-lighting of the lamp. No further action has been taken.

Drighlington Gas Company and the Bradford Corporation.—In the course of the recent municipal elections at Bradford it has transpired that the Drighlington Gas Company, whose area of supply includes the urban part of Tong, which is within the city of Bradford, have offered to sell the undertaking to the Bradford Corporation. If the Corporation were to take over the Drighlington Company's undertaking, the Tong people would probably be called upon to pay the full Bradford rates, and would get cheaper gas. Bnt it seems that they would be losers by the change; for, while they are paying 5s. 10d. per 1000 c.ft. to the Company for light (1s. 10d. more than the Bradford price) and 4s. 7d. for cooking, heating, and motive power (Bradford's prices are 4s. for light, cooking and heating, and 3s. 5d. for motive power), the difference in rates is 4s. 3d. in the pound. Furthermore, the Drighlington Company have arranged (if the works are not taken over by the Corporation) to reduce the price of gas at the end of the year to 5s. 5d. for lighting, and 4s 2d. for the other uses. Representatives of the Company and the Corporation have met, but have not reached any agreement.

Children's National Gas Exhibition Competitions.—In last week's "JOURNAL" (p. 335) there was published the list of prize winners in the National Gas Exhibition essay competitions open to employees of gas undertakings. We have since received from the Hon. Secretary (Mr. R. J. Rogers) the names of the winners of the many prizes in the essay competition for school children, on the subject of "What Interested me most at the Exhibition, and Why?" The essays sent in showed clearly the benefit to children of the Exhibition from an educational point of view.

Capital for Elstree and Boreham Wood.—It will be noted from our advertisement columns that Messrs. A. & W. Richards have been instructed by the Directors of Elstree and Boreham Wood Gas Company, Ltd., to offer for sale by tender 720 £10 6 p.ct. preference shares, the minimum price of issue being par. The Company's district adjoins the areas of the North Middlesex, Barnet, Harrow, Watford, and St. Albans Gas Companies. The sale of gas for the year ended March 31, 1914, was 19 million c.ft., and for the year ended March 31, 1923, it was upwards of 43 million c.ft. It is for repayment of an overdraft incurred in extensions of works, mains, &c., rendered necessary by the increasing demand for gas, that the present issue of capital is being made.

A new gasholder which has recently been erected at Pittenweem Gas-Works was formally opened last week by Provost Ogilvie, Chairman of the Pittenweem Gas Light Company. The contractors for the tank and holder were Messrs. Newton, Chambers, & Co.

The Directors of the Montevideo Gas and Dry Dock Company, Ltd., have declared an interim dividend on the ordinary stock for the half-year ended June 30 last of 2 p.ct. (actual), free of income-tax, payable on Dec. 1. This is the same as in the previous year.

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